A Dissertation on

A STUDY OF MANAGEMENT OF RECURRENT AND REFRACTORY POSTERIOR EPISTAXIS BY TRANSNASAL ENDOSCOPIC SPHENOPALATINE ARTERY CAUTERIZATION

Submitted to

THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY

In partial fulfilment of the requirements

For the award of the degree of

M.S.BRANCH IV
(OTORHINOLARYNGOLOGY)

GOVERNMENT STANLEY MEDICAL COLLEGE
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APRIL 2016

DECLARATION

I, **Dr. S.KARTHIK**, solemnly declare that the dissertation, titled **"A STUDY OF MANAGEMENT OF RECURRENT AND REFRACTORY POSTERIOR EPISTAXIS BY TRANSNASAL ENDOSCOPIC SPHENOPALATINE ARTERY CAUTERIZATION"** is a bonafide work done by me during the period of August 2014 to July 2015 at Government Stanley Medical College and Hospital, Chennai under the expert supervision of **PROF. DR.F.ANTHONY IRUDHAYARAJAN, M.S., D.L.O.,** Professor, Department of Otorhinolaryngology, Government Stanley Medical College and Hospital, Chennai.

This dissertation is submitted to The Tamil Nadu Dr. M.G.R. Medical University in partial fulfilment of the rules and regulations for the M.S. degree examinations in Otorhinolaryngology to be held in April 2016.

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CERTIFICATE

This is to certify that the Dissertation - **"A STUDY OF MANAGEMENT OF RECURRENT AND REFRACTORY POSTERIOR EPISTAXIS BY TRANSNASAL ENDOSCOPIC SPHENOPALATINE ARTERY CAUTERIZATION"** presented by **DR.S.KARTHIK**, is an original work done in the Department of Otorhinolaryngology, Government Stanley Medical College and Hospital, Chennai in partial fulfillment of regulations of the Tamil Nadu Dr. M.G.R. Medical University for the award of degree of M.S. (Otorhinolaryngology) Branch IV, under my supervision during the academic period 2014-2016.

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ACKNOWLEDGEMENTS

I wish to express my sincere thanks to **Prof. Dr. ISSAC CHRISTIAN MOSES, MD, FICP, FACP**, The DEAN, Government Stanley Medical College and Hospital for having permitted me to utilize the facilities of the hospital for conducting this study.

My heartfelt gratitude to **Prof. Dr. T. BALASUBRAMANIAN, M.S., D.L.O.,** Professor and Head of the Department, Department of Otorhinolaryngology, Government Stanley Medical College and Hospital for his constant motivation, valuable suggestions, and expert supervision during the course of this study.

I express my whole-hearted gratitude to **PROF. DR. F. ANTHONY IRUDHAYARAJAN M.S., D.L.O,** Professor and Chief of ENT, UNIT II of Otorhinolaryngology**, Prof. Dr. N. SEETHALAKSHMI M.S., D.L.O., D.N.B,** Former Professor of Otorhinolaryngology, Stanley medical college, for supporting, guiding and encouraging me in this study.

I wish to thank my **Assistant Professors**, **DR.C.KARUPPASAMY M.S., D.L.O., DR.K.ATHIYAMAN M.S,**

Dr. C.BHARANIDHARAN, D.L.O., Dr.SARAVANA SELVAN, M.S., Dr. SURESH, M.S., for their valuable tips and guidance.

I am grateful to all the other post-graduates who most willingly helped me during this study period. I also thank the staff nurses, Theatre personnel, OPD staff, Department of Otorhinolaryngology, Government Stanley Hospital for their co-operation and assistance in the conduct of this study.

I wish to extend my gratitude to my statistician for his expert assistance.

Last but not the least, I am indebted and grateful to all the **Patients** who constitute the backbone of this study, who most willingly and selflessly subjected themselves to this study for the sake of the benefit of their community and without whom this study would not have been possible.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF GRAPHS

LIST OF FIGURES

LIST OF ABBREVIATIONS

ALT – ALANINE AMINOTRANSFERASE

APTT-ACTIVATED PARTIAL THROMBOPLASTIN TIME

AST - ASPARTATE AMINOTRANSFERASE

B-BLEEDING

BL-BILATERAL

BT – BLEEDING TIME

C-CONGESTION

CL-CLOTS

CT- CLOTTING TIME

DM-DIABETES

HT-HYPERTENSION

INR - INTERNATIONAL NORMALIZED RATIO

L-LEFT

PT- PROTHROMBIN TIME

R-RIGHT

DSL-DEVIATED SEPTUM TO LEFT

DSR- DEVIATED SEPTUM TO RIGHT

SM-SMOKING

SPA- SPHENOPALATINE ARTERY

SGOT – SERUM GLUTAMIC OXALOACETIC TRANSAMINASE

SGPT – SERUM GLUTAMIC PYRUVIC TRANSAMINASE

TESPAL-TRANSNASAL ENDOSCOPIC SPHENOPALATINE ARTERY LIGATION

ABSTRACT

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Epistaxis is one of the common emergencies in ENT practice. Most of them can be controlled by conservative means. Intractable posterior epistaxis is a challenging problem that needs invasive procedures for effective control in some patients.

AIM: To assess the effectiveness of Transnasal Endoscopic Sphenopalatine Artery Cauterization for Recurrent and Refractory posterior epistaxis.

MATERIALS AND METHODS: Between August 2014 to July 2015, a total of 23 patients (17 males and 6 females) with recurrent and refractory posterior epistaxis underwent Transnasal Endoscopic Sphenopalatine Artery Cauterization in the Department of Otorhinolaryngology, Govt. Stanley Medical College. 19 patients underwent surgery as an elective procedure while 4 were operated on emergency basis.

RESULTS: Among 23 patients, 22 had control of epistaxis with no recurrence in the entire follow up period of three month.One patient had one episode, three weeks after surgery but was controlled by conservative means. He had no more episodes thereafter. We achieved a success rate of 99.2 percent for the follow up period.

CONCLUSION: Transnasal Endoscopic Sphenopalatine Artery Cauterization is a safe, simple and effective procedure done under General or Local Anaesthesia with very low morbidity and less complication rates compared to other invasive procedures. It can be done with same the instruments used for Endoscopic Sinus Surgery. Considering the above facts, it can be considered as the immediate second line of management when conservative measures fail.

INTRODUCTION

INTRODUCTION

Epistaxis is a common problem ranging from minor bleeding or clot to isolated massive bleeding that may be life-threatening. Most patients have self-limiting episodes that do not require medical care and thus the true incidence is unknown. In spite of this, there is an estimated global lifetime incidence of 60% [1]. From an otolaryngologic standpoint, up to 33% of emergency admissions are for epistaxis. It has a bimodal age distribution[4] with an increased incidence in childhood followed by a peak incidence in the sixth decade. While younger individuals overwhelmingly present with minor bleeding derived from the anterior septum, older patients are likely to present with an acute severe bleeding.

The aetiology in majority of these cases is commonly idiopathic[9] followed by traumatic or iatrogenic causes, inflammatory and primary neoplasm.

Epistaxis can be anterior or posterior in origin from septum or lateral nasal wall. A brief history helps in determining the cause.

Most episodes are minor in nature that does not require intervention or medical evaluation. Minor bleeding episodes occur more frequently in children and adolescents, whereas severe bleeds requiring

otolaryngologic intervention often occur in individuals older than 50 years[2].

The management of epistaxis remains to be a challenging problem for most ENT surgeon especially posterior epistaxis**.** It ranges from the replacement of blood loss, direct visualization and cautery, nasal packing, and surgical (endoscopic or external) embolization depending upon the quantity and frequency of blood loss.

AIM
OF
THE STUDY

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To assess the effectiveness of Transnasal Endoscopic Sphenopalatine Artery Cauterization for Recurrent and Refractory posterior epistaxis.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

HIPPOCRATES (5th century BC) - noted that pressure over alae nasi is an effective way to control epistaxis.

ALI IBN RABBIN AL - TABIRI (850 A.D.) –In his work, 'THE *PARADISE OF WISDOME'* to epistaxis - "The complaint of nose bleeding is due to swelling of a vein and its rupture, or perhaps a reduction in the force which confines the blood within".

MORGAGNI (1769) – 'The extremely turgid blood vessels about that part where the alae nasi are formed with the bone, about a finger's breadth more or less from the bottom of the nostril'. He was reported to have stopped nose bleeds by introducing his finger and 'pressing that part whereupon the blood ceased to flow, so that it was not even discharged by posterior nostril into the fauces' [3]. **MORGAGNI** drew his inspiration from his teacher "VALSALVA" and for this reason Little's area is referred to as "LOCUS VALSALVAE".

VALSALVA – Thought that the nasal bleeding was arterial in origin, and he stopped the bleeding by 'syringing the nose with cold water and applied spirit of wine to contract the mouths of swollen arteries'

MOHAMMED (1880-81) -"the frequency with which severe epistaxis occurs in old people with high arterial pressure is striking and for them very fortunate, for if their noses did not bleed their brains would."

JAMES LITTLE (1879) - identified the bleeding site at the caudal end of the septum and a year later "KIESSELBACH" made same observations, as LITTLE.

BARTLETT AND MCKITTRICK (1917) - first attempt of arterial ligation (common carotid) in 1868.

SCIFFERT (1928) – Introduced ligation of Internal Maxillary Artery via a transantral approach.

BURNHAM (1935) - explained division of inferior and middle turbinate arteries from posterior lateral division of sphenopalatine artery

GOOD YEAR (1937) -The first Anterior Ethmoidal Artery Ligation

LANGER AND TERRY -Endoscopic anterior ethmoid artery ligation

WOODRUFF (1949) - woodruff plexus in the posterior end of inferior meatus is a common site in adults.

SEIFFERT (1978) - first Transantral ligation of Internal Maxillary Artery.

MARCUS (1940) - revealed that endoscopy is helpful in diagnosing epistaxis[5].

BURDOVICH and SAETTI (1992) - First described TRANSNASAL ENDOSCOPIC SPHENOPALATINE ARTERY LIGATION (TESPAL)

VASCULAR ANATOMY OF NOSE

Nasal cavity is an extremely vascular. Terminal branches from External and Internal Carotid arteries supply the nasal mucosa with frequent anastomosis between these two systems.

Figure 1

LATEX INFUSION SHOWING RICH VASCULAR SUPPLY OF NOSE

EXTERNAL CAROTID SYSTEM

Facial artery and the Internal maxillary artery - the terminal branches of External Carotid Artery that supplies the nasal cavity.

The facial artery, through the superior labial artery, supplies the anterior nasal septum.

The internal maxillary artery courses within the pterygopalatine fossa, and it terminates as sphenopalatine, descending palatine, pharyngeal, infraorbital, and posterior-superior alveolar arteries.

INTERNAL CAROTID SYSTEM

Internal carotid artery supplies nose via the ethmoid Arteries. These branches of the ophthalmic artery, enters the orbit with the optic nerve. They enter through foramina in the medial orbital wall, within the frontoethmoidal suture.

The anterior ethmoidal foramen is located 24 mm behind the lacrimal crest. The posterior ethmoidal foramen can be found 12 mm posterior to the anterior one. The posterior ethmoid artery can be absent in up to one third of individuals .The optic nerve is located 6 mm posterior to the posterior ethmoid artery, when the artery is present.

During open ligation these measurements serve as useful guides to prevent injury to the optic nerve. Once leaving the orbit, they course medially along the roof of the ethmoid sinuses and supply the nasal septum. The anterior ethmoid artery crosses the roof of ethmoid sinuses just posterior to the frontal sinus ostium. The artery's position may be within the ethmoid roof or, occasionally, may lie more inferiorly, within a bony partition that acts like a mesentery. In this situation, it is more easily injured during endoscopic procedures.

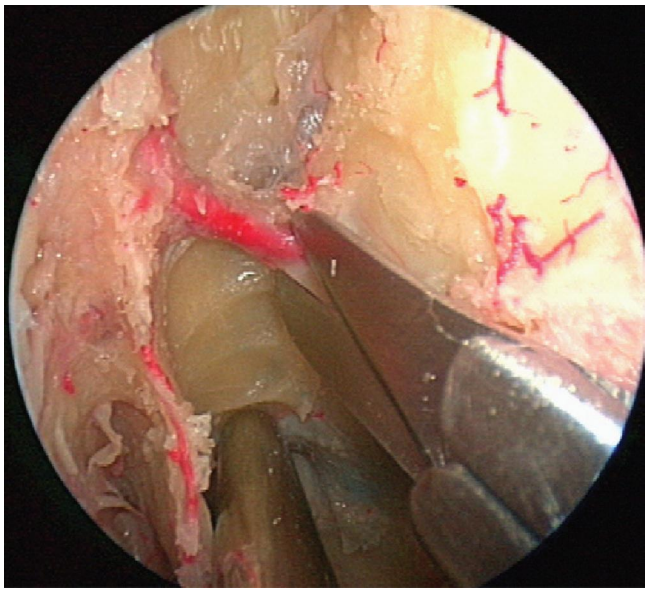


Figure 2

ENDOSCOPIC VIEW OF LEFT SKULL BASE IN LATEX INJECTED SPECIMEN SHOWING THE COURSE OF ANTERIOR ETHMOIDAL ARTERY

INTERNAL MAXILLARY ARTERY

It is the largest terminal branch of external carotid artery. It supplies

- External and middle ears, and the auditory tube
- The Dura mater
- Upper and lower jaws
- The muscles of the temporal and infratemporal regions
- Nose and paranasal sinuses
- Palate
- Roof of the pharynx

It is divided into three parts by lateral pterygoid

1. First part (mandibular): deep auricular, anterior tympanic, middle meningeal, accessory meningeal, inferior alveolar branches
2. Second part (pterygoid): deep temporal, pterygoid, masseteric, buccal branches.

3. Third part (Pterygopalatine): posterior superior alveolar, infraorbital, greater palatine, pharyngeal, artery of pterygoid canal, sphenopalatine artery (terminal branch).

Among the above branches posterior superior alveolar branch supply the maxillary sinus, pharyngeal branch supply root of the nose and sphenoid sinus, and sphenopalatine artery supplies majority of the lateral and medial wall of the nose and various sinuses.

BRANCHES OF INTERNAL MAXILLARY ARTERY

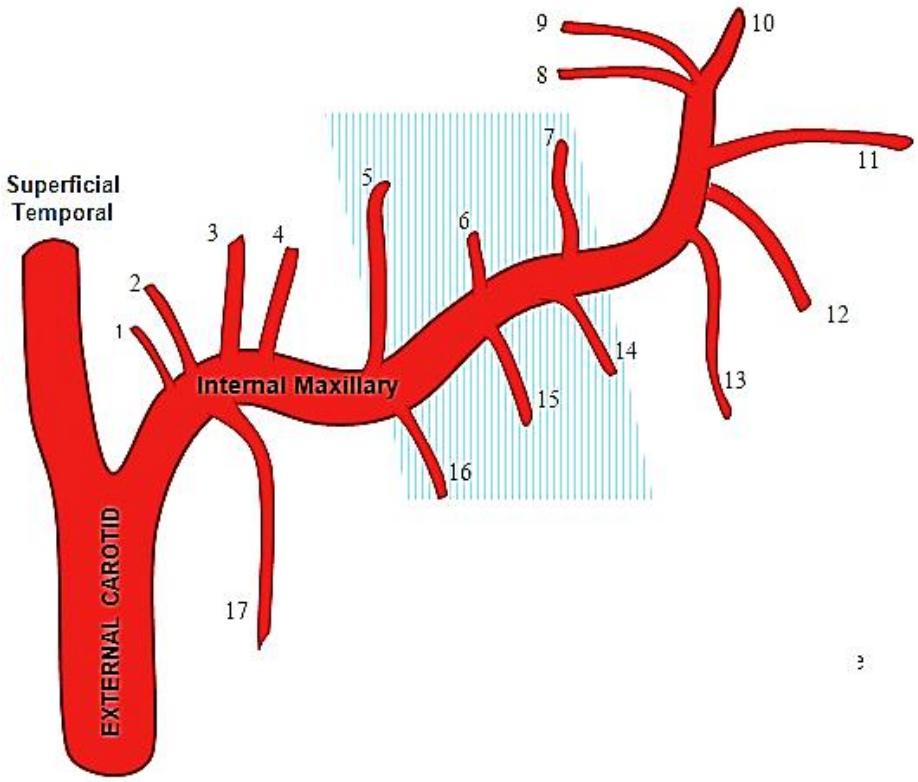


Figure 3

SCHEMATIC DIAGRAM SHOWING

INTERNAL MAXILLARY ARTERY - BRANCHES

1. Deep auricular,

2. Anterior tympanic,

3. Middle meningeal,

4. Accessory meningeal,

5. Posterior deep temporal,

6. Pterygoid,

7.Anterior deep temporal

8. Artery of pterygoid canal,

9.Pharyngeal,

10. Sphenopalatine,

11. Infra-orbital

12. Posterior superior alveolar,

13.Descending palatine,

14. Buccal,

15. Pterygiod,

16. Masseteric,

17. Inferior alveolar branches.

ANATOMY OF SPHENOPALATINE ARTERY

Sphenopalatine artery is the artery of epistaxis. The branching of sphenopalatine artery when entering the nasal cavity is a key point in the understanding of the management of posterior epistaxis. The sphenopalatine Artery, through the sphenopalatine foramen, enters the nasal cavity, and divides into conchal (posterolateral) and septal (posteromedial) branches. The sphenopalatine artery normally starts to branch lateral to the ethmoid crest, and these branches vary widely. It may also divide within the pterygopalatine fossa, before passing through the foramen. 97% of individuals have two or more branches medial to the ethmoid crest, 67% have three or more branches, and 35% have four or more branches, in a study by Simmen and colleagues[76]. **These anomalies are of great importance during ligation or cauterisation of the artery because the surgeon must search for multiple vessels to treat bleeding from the SPA effectively.**

Figure 4

CADAVER SPECIMEN OF SPHENOPALATINE ARTERY SHOWING MULTIPLE BRANCHES

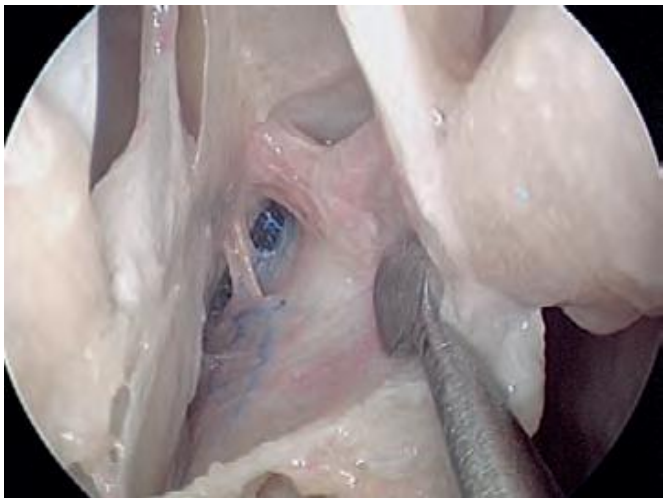


Figure 5

ENDOSCOPIC VIEW OF SPHENOPALATINE ARTERY

SPHENOPALATINE FORAMEN

Majority of the blood supply to nose is through this foramen. It lies medial to Pterygopalatine space. It contains the sphenopalatine artery, veins and the nasopalatine nerves. The crista ethmoidalis, a bony projection comes off the lateral nasal wall near the root or posteroinferior base of the middle turbinate. It is anterior to the foramen in most of the cases. The anterior branch of the artery comes around the crista and can be found as it runs forward in the lateral nasal wall over the posterior fontanelle. IT IS AN IMPORTANT LANDMARK FOR SPHENOPALATINE ARTERY DURING LIGATION **OR CAUTERIZATION**.

PTERYGOPALATINE FOSSA

It is closely related to sphenopalatine foramen.It is bounded

Anteriorly - superomedial aspect of posterior wall of maxilla

Posteriorly - root of ptyerygoid process and the adjoining part of anterior surface of greater wing of sphenoid

Medially - upper part of perpendicular plate of palatine bone

Laterally - pterygomaxillary fissure

Superiorly - body of sphenoid

Inferiorly- closed by palatine bone (pyramidal process) in the angle between maxilla and the pterygoid process.

Contents

- Third part of maxillary artery and its branches.
- Maxillary nerve and its two branches, zygomatic and posterior superior alveolar nerves.
- Pterygopalatine ganglion and its branches.

Figure 6

ETHMOIDAL CREST

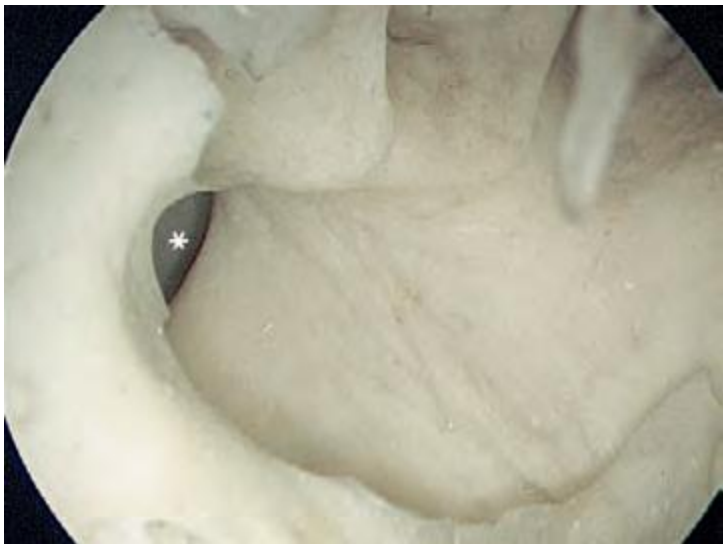


Figure 7

***SPHENOPALATINE FORAMEN**

SUMMARY OF VASCULAR ANATOMY

EXTERNAL CAROTID ARTERY

- Facial artery
  - Superior labial artery
  - Lateral Nasal artery
  - Ascending palatine artery
- Maxillary artery
  - Greater palatine artery
  - Sphenopalatine artery
  - Conchal (posterolateral)
  - Septal (posteromedial)

INTERNAL CAROTID ARTERY

- Anterior ethmoidal Artery
- Posterior ethmoidal Artery

VENOUS DRAINAGE

Anterior part –through the superior labial and greater palatine veins into facial vein and finally into external jugular vein. Retrocolumellar vein runs just 2 mm behind and parallel to the columella. This vein is very superficial and causes of venous epistaxis in children.

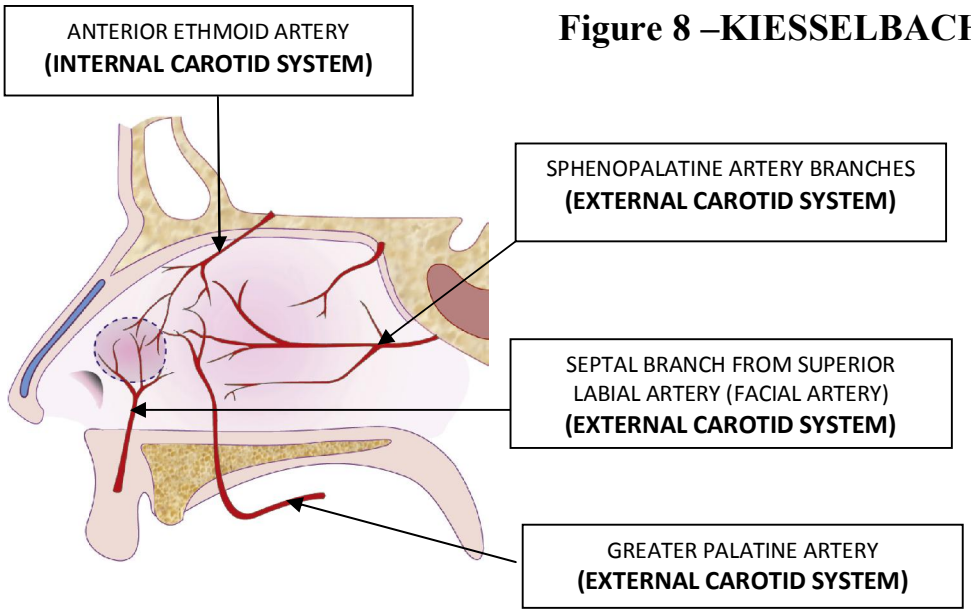
Laterally - pterygoid venous plexus and ultimately into internal jugular vein.

SPECIAL AREAS OF BLEEDING

LITTLE'S AREA: It is located in the anterior inferior part of nasal septum, just above the vestibule.

Kiesselbach's plexus (1880) formed by **anastomosis of external and internal carotid systems.**

Figure 8 –KIESSELBACH'S PLEXUS



WOODRUFF'S PLEXU

WOODRUFF'S PLEXUS: It is present at the posterior end of the inferior meatus where the sphenopalatine and posterior pharyngeal arteries anastomose. Bleeding from this area could result in prolonged oozing.

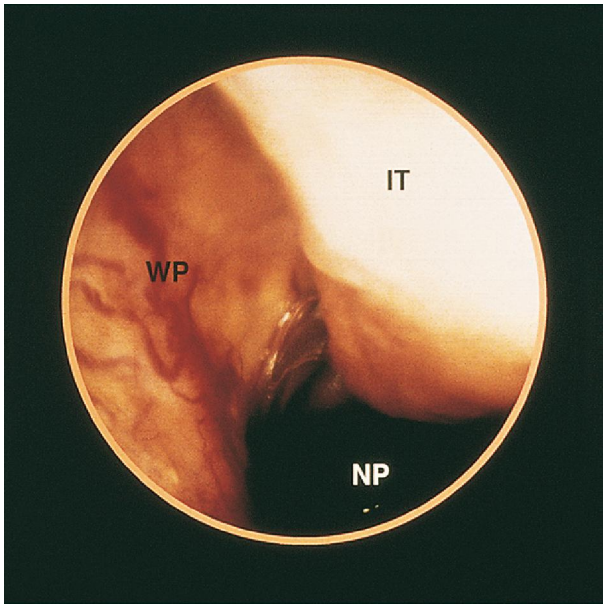


Figure 9

WP – WOODRUFF'S PLEXUS

IT – INFERIOR TURBINATE

NP - NASOPHARYNX

VENOUS BLEEDING

Arises from Retrocolumellar veins found anterior to little's area. It is one of the common cause of bleeding in young adults.

Haemorrhagic nodules - Padgham and Parham (1993)[13]

Aneurysmal dilatation of artery with its walls showing hypertensive changes with connective tissue showing haemorrhage and thrombus

SEPTAL DEVIATIONS AND SPUR

SEPTAL DEVIATIONS: They are smooth deflections of bony or cartilaginous septum or both. They may be 'C' or 'S' shaped.

DISLOCATION OF SEPTUM: cartilaginous displacement into the nasal cavity.

As per **Bernoulli's principle** which states that when air flows through a constricted portion the pressure drops leading to mucosal edema over the deflected portion leading on to predisposition to infection and epistaxis.

Septal turbinate - It represents an area of engorged mucosa in the septum visible in CT. It may be unilateral or bilateral. Submucosal

resection of septum prevents further episodes of bleeding supporting the fact that it is a source of epistaxis.

Brown's area: posterior part of the septum.

DYNAMICS OF NASAL CIRCULATION

It depends upon **ARTERIOARTERIAL ANASTOMOSIS**: anastomotic channels between anterior and posterior ethmoid arteries and sphenopalatine artery. This was proven by **Shaheen (1967)** who studied the characteristics of dispersion of dye by altering the pressure in the internal and external carotid systems. The rapidity of displacement of the dye confirms it.

ANASTOMOSIS OF ARTERIES ACROSS MIDLINE also has to be taken into account in treatment of epistaxis as it may be a cause of recurrent bleeding. It takes place at the nasopharynx or between two anterior ethmoid arteries across crista galli. It is supported by the fact that bleeding after arterial ligations continues and wrong assumption of ligating a wrong vessel.

Similarly **ARTERIOVENOUS ANASTOMOSIS** is also documented at the anterior nasal cavity in the septum and inferior turbinate at a microscopic level.

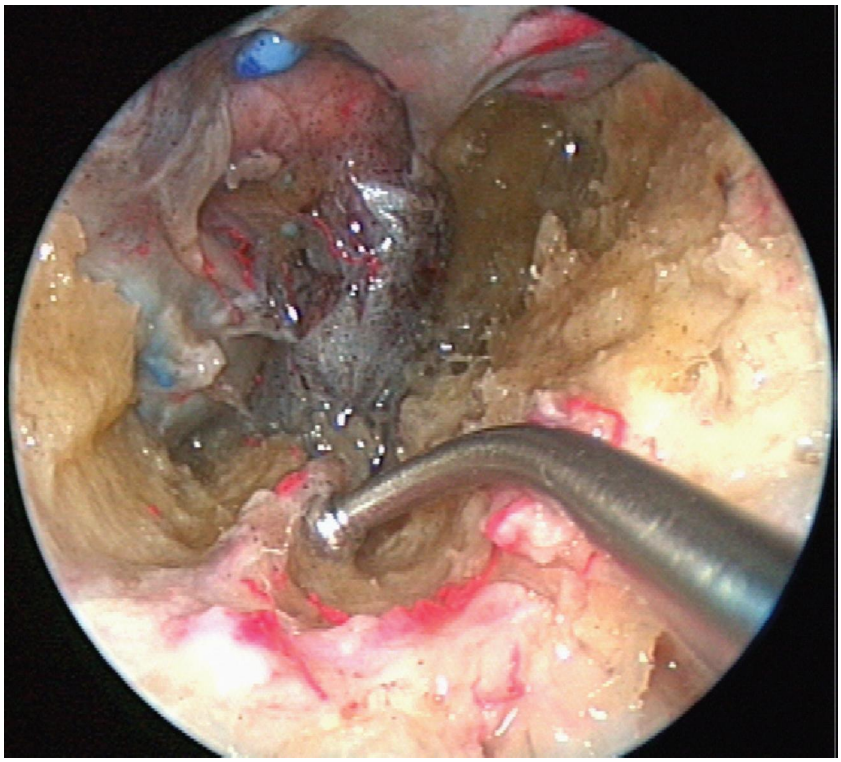


Figure 10

ENDOSCOPIC VIEW OF LATEX INJECTED SPECIMEN SHOWING VIDIAN ARTERY (BALL PROBE POINTING) ALONG FLOOR OF RIGHT SPHENOID FLOOR ANASTOMOSING INTERNAL CAROTID WITH SPHENOPALATINE ARTERY (EXTERNAL CAROTID SYSTEM)

VASCULAR PATHOLOGY OF NOSE

Examination of the medium and smaller nasal arteries of persons dying in middle and old age has shown that these are subject to a progressive replacement of the muscle tissue in the tunica media by collagen (Shaheen, 1967)[11]. This change varies from interstitial fibrosis to almost complete replacement of the muscle by scar tissue. It seems that persons giving a history of epistaxis exhibit more severe changes, but this is not to say that these changes are necessarily responsible for vessel rupture. They could, however, account for the lengthy duration of arterial haemorrhages, presumably because of a failure of the vessel to contract down in the absence of sufficient muscle in the tunica media[3].

It is also apparent that larger vessels of the calibre of the maxillary artery are prone to calcification (Monckeberg's sclerosis)[3]. The resulting lack of elasticity could be contributed to the pathogenesis of small vessel rupture by the creation of a local systolic hypertension. The precise mechanism of bleeding is thought to be a dissecting aneurysm of the nasopalatine artery or one of its branches, but the factors initiating this process have, so far, not been identified..

It is also a mystery why bleeding should occur from the retrocolumellar vein in young subjects. Careful inspection of the site

shortly after a bleed sometimes reveals a tiny area of local ballooning overlying the vein, and this could possibly signify an area of vessel wall weakening, perhaps as a result of localized ischemia and or trauma.

EPISTAXIS – A CLINICAL CLASSIFICATION

IDIOPATHIC - Unknown aetiology. Most of the cases fall into this category

SECONDARY – proven causal factor

LOCAL

SYSTEMIC

CHILDHOOD (<16 years)

ADULTHOOD (>16 years)

ANTERIOR - Bleeding source **anterior** to plane of pyriform aperture. It is more common [7] and originates from anterior septum, vestibule and mucocutaneous junction.

POSTERIOR - Bleeding source **posterior** to plane of pyriform aperture. It is usually high volume bleeding. **The branches of the sphenopalatine artery** contribute to it**.** Further subdivided based on the location as

- Lateral wall
- Septum
- Nasal floor

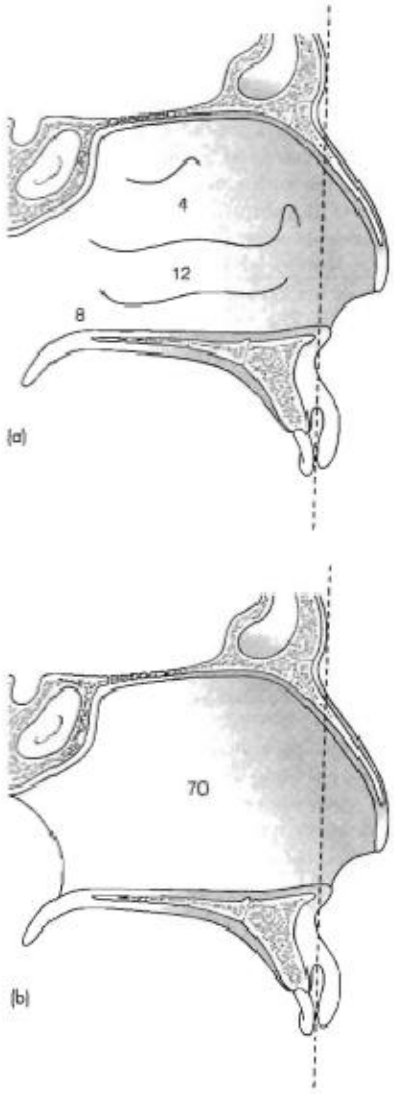


Figure 11

BLEEDING SITES: POSTERIOR EPISTAXIS FROM (a) LATERAL WALL AND (b) SEPTUM. THE NUMBER DENOTES PERCENTAGE OF BLEEDING (6% NOT LOCATED)

AETIOLOGY OF EPISTAXIS

IDIOPATHIC

Little's area,

Woodruff's plexus

Superior part of nose

Middle meatus

LOCAL

Congenital:

Unilateral Choanal Artesia

Meningocele

Encephalocele

Glioma

Trauma

Nose picking

Nasal oxygen and continuous positive airway pressure

Nasal fracture

Iatrogenic

- Surgery
  - Endoscopic Sinus Surgery
  - Endoscopic Base of Skull Base
  - Septal surgeries
  - Turbinate reduction
- Instrumentation
  - Nasotracheal intubation
  - Nasogastric tube

Anatomic deformity

- Septal deformity
- Spurs
- Septal perforation

Tumours (includes Benign, Malignant, Vascular)

- Nasal Papilloma
- Esthesioneuroblastoma

Pyogenic Granuloma

Carcinoma and other nasal malignancies

Metastasis

Juvenile Angiofibroma

Hemangioma of the septum and turbinates

Hemangiopericytoma (Glomangiopericytoma)

Foreign bodies

Non living such as neglected foreign body, Rhinolith

Live - maggots, leeches

Inflammation

Rhino sinusitis

Nasal polyposis

Granulomatous disease

Wegener granulomatosis

Sarcoidosis

Tuberculosis

- Syphilis
- Leprosy

Topical medications

- Topical steroids
- Topical decongestants and cocaine (Rhinitis medicamentosa)
- Inhalants
  - Tobacco
  - Heroin
  - Cannabis
  - Chrome
  - Phosphorus
  - Wood dust
  - Mercury

Environmental irritants

- Smoke
- Chemicals

Pollution

High Altitude

Low humidity

SYSTEMIC

Drugs (Coumarin, Warfarin, Aspirin, Enoxaparin, Heparin, NSAID)

Bleeding diatheses

Coagulopathies

Inherited

Deficiency of Coagulation factors, i.e. factor VIII and factor IX (Haemophilias)

■ **Acquired**

Anticoagulants

Liver disease

Vitamin A, C, D, E, K deficiency

Disseminated intravascular coagulation (DIC)

Acquired inhibitor

Platelet disorder

Congenital

Von Willebrand's disease

Bernard Soulier syndrome

Glanzmann's thrombasthenia

Acquired

Myeloproliferative disease

Leukaemia

Uraemia

Dysparaproteinaemias

Drugs: Aspirin, NSAID's

Acquired storage pool disease

Thrombocytopenia

Congenital

Acquired

Bone marrow Aplasia

Marrow failure

Infiltration

Increased consumption

Immune

DIC

Hypersplenism

Excessive blood loss

Drugs

Disorder of blood vessels

Congenital

Osteogenesis imperfecta

Hereditary Haemorrhagic Telangiectasia

Acquired

Amyloid

Vasculitis

Hyperfibrinolysis

Congenital

α2 antiplasmin deficiency

Acquired

Malignancy

DIC

Fibrinolytic therapy i.e. streptokinase.

Hematologic malignancy

Leukaemia

Lymphomas

Vascular and connective tissue disorders

Arteriosclerosis

Hepatobiliary - Hepatic cirrhosis (causing deficiency of factors II, VII, IX and X)

Hypertension*

Alcoholism**

Malnutrition

Hypothyroidism

Cardiovascular conditions that increase venous pressure (mitral valve stenosis, Congestive heart failure)

HIV

* Previously Hypertension was considered to be a cause. However many studies have failed to prove a causal relation [28, 29, 30, 37] .It has not shown to be an independent risk factor [12].The apparent increase in blood pressure is attributed to anxiety associated with hospitalisation and invasive procedure in controlling epistaxis.

** A higher incidence of epistaxis is seen in patients with a high alcohol intake, even in the absence of any evidence of abnormality when testing coagulation.[39] Indirect markers of alcohol overuse include the Mean Corpuscular Volume, γ-Glutamyltransferase, Alanine Aminotransferase and Aspartate Aminotransferase.[40] Enquiry about drinking habits should be made, and help should be offered to affected patients. Epistaxis patients are more likely to have consumed alcohol within 24 hours of bleeding.

EPISTAXIS TRAY

SUPPLIES AND EQUIPMENT FOR THE EVALUATION AND TREATMENT OF EPISTAXIS IN THE URGENT CARE SETTING

- Personal protective supplies
    - Mask
    - Gown
    - Eye protection
- Wall suction and tubing
- Frazier tip suctions, size 10 and 12 French
- Headlight
- Nasal speculum
- Bayonet forceps
- Cotton or neurosurgical cottonoid sponges
- Silver nitrate cautery sticks
- Packing materials
    - Merocel nasal sponges (Merocel Corporation)
    - Vaseline strip gauze (Sherwood medical)

- Gelfoam (Upjohn company)
- Surgicel (Johnson & Johnson)

- Suction cautery unit
- 0, 30, 45 - degree rigid nasal endoscopes with light source
- Optional loupe magnification
- Vasoconstrictors and anesthetics
  - 4% or 10% cocaine (combination anesthetic / decongestant)
  - 2% topical lidocaine solution
  - 1% injection lidocaine with 1:100,000 epinephrine
- Antibiotic ointment (without neomycin)
- Tongue blades
- Two 10-cc syringes with 18- and 27- gauge needles
- Epistaxis tray helps to attend cases immediately, to take emergency measures and to treat the patients effectively.
- Avoids delay in attending patients.

INVESTIGATIONS FOR EPISTAXIS

Complete Blood Count including

- Haemoglobin (Hb %)
- Packed Cell Volume
- Total count
- Differential count
- Platelet count

Blood Urea

Serum Creatinine

Liver function tests comprising of

- Direct and Indirect Bilirubin
- Liver transaminases (AST /SGOT and ALT/SGPT)

Coagulation Profile

- Bleeding Time (BT)
- Clotting Time (CT)
- Prothrombin Time (PT)

Activated Partial Thromboplastin Time (APTT)

INTERNATIONAL NORMALIZED RATIO (INR)

Blood Grouping / Rh typing and cross matching –for emergency or peri operative transfusions if necessary

Peripheral smear

ELISA –HIV I and II

HBsAg

Anti HCV

Urine - Albumin, Sugar, Deposits

ECG

Chest X - ray

Blood Pressure Monitoring

Diagnostic Nasal Endoscopic Examination

CT SCAN of paranasal sinus - plain and contrast

Angiography / Digital Subtraction Angiogram

MRI – Paranasal Sinuses / Brain / Angiogram

Clinical Examination

DIAGNOSTIC NASAL ENDOSCOPY (DNE) in outpatient department or in

Theatre

TREATMENT OF EPISTAXIS

General treatment

Local treatment to stop bleeding

Treatment of specific cause of bleeding

Arterial ligation and cauterization

Embolization

GENERAL TREATMENT

Reassurance

Bed rest

Sedation

Hospitalisation

Treatment of Shock – Resuscitation

1. Fluid replacement – crystalloids, colloids.

2. Blood Transfusion – if packed cell volume below 25%.

Antibiotic – for prevention of secondary infection.

Haemostatics

LOCAL TREATMENT

1. Trotter's method

2. Anterior nasal packing

Vaseline Gauze

Gelfoam

Merocel, etc.,

3. Post nasal packing

Gauze

Foley's catheter

Balloon packs, etc.,

Irrigation with hot water

4. Cauterization of bleeding point

Chemical - 1% Silver nitrate sticks

40% Trichloracetic acid

Copper sulfate

Carbolic acid

Diathermy

VARIOUS SURGERIES IN THE MANAGEMENT OF EPISTAXIS

SEPTAL SURGERIES

a. SEPTOPLASTY
b. SUB MUCOSAL RESECTION OF SEPTUM
c. SPURECTOMY
d. SEPTAL CORRECTION
e. SEPTODERMOPLASTY

ARTERIAL LIGATIONS / CAUTERIZATION

a. ANTERIOR / POSTERIOR ETHMOIDAL ARTERY

b. SPHENOPALATINE ARTERY

c. INTERNAL MAXILLARY ARTERY

d. EXTERNAL CAROTID ARTERY

SELECTIVE ARTERIAL EMBOLISATION

ANTERIOR ETHMOIDAL ARTERY LIGATION / CAUTERIZATION

It is a rare cause of epistaxis, usually following trauma to ethmoidal complex fractures or during Endoscopic Sinus Surgery and Endoscopic Skull Base Surgery especially in case of a dehiscent bony canal or a well pneumatised suprabullar recess. It leads on to profuse bleeding, intra orbital bleeding, or sometimes intra cranial bleeding..The importance of such bleeding is supported by the fact that it may lead to blindness if not intervened at the right time. It is situated between the second and third lamella and in 85% of cases situated in suprabullar recess. However its position may be variable. A dehiscent anterior ethmoidal artery can be present in 11%-40% of cases [91].CT is very important in locating it. It can be ligated or cauterised Endoscopically or traditional external route (Lynch incision –medial canthotomy).

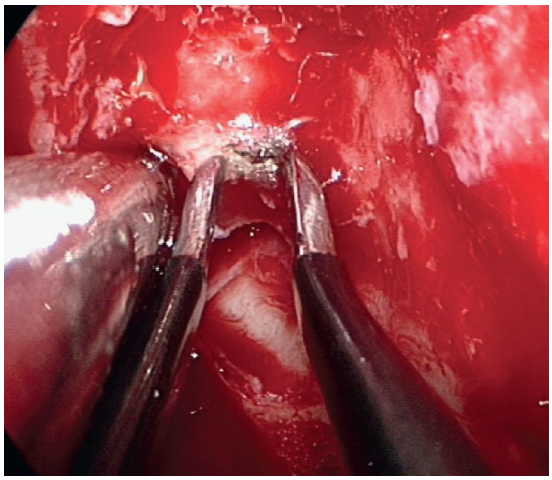


Figure 12

ANTERIOR ETHMOID ARTERY CAUTERISATION

INTERNAL MAXILLARY ARTERY LIGATION

It was practised before Endoscopic sphenopalatine artery ligation, by transantral route by sublabial or a combined (endoscopic- anterior and medial) approach. A window is created in the posterior wall of antrum and pterygopalatine fossa entered. The sphenopalatine artery, descending palatine and proximal internal maxillary artery are clipped and divided. It has a failure rate as high as 40 % due to technical difficulty or missing of terminal branches in the fossa. Complications like sinusitis, infra orbital nerve injury, oro antral fistula, dental damage are reported.[9]

EXTERNAL CAROTID LIGATION

By a horizontal skin crease incision through skin and platysma, between hyoid bone and upper border of thyroid cartilage, the centre located at the anterior border of sternocleidomastoid muscle, the carotid bifurcation is identified. External carotid is identified and checked and then ligated distal to superior thyroid artery.

Rich cross anastamosis and ligation far away from the bleeding site coupled with technical difficulty have made this procedure less preferred. It also prevents future embolization procedures. Complications like cerebrovascular ischemia, hematoma, and wound sepsis have been reported.

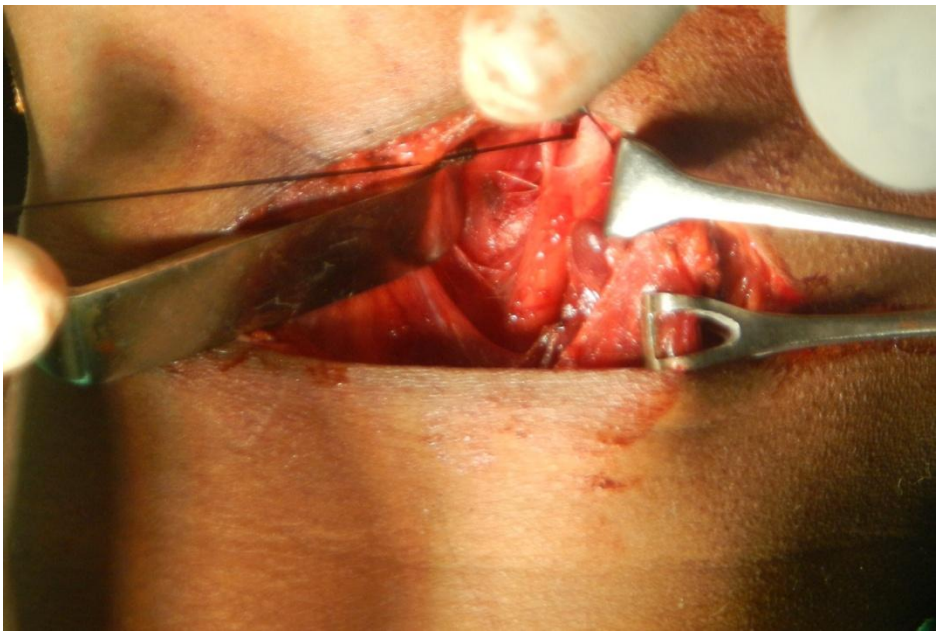


Figure 13

EXTERNAL CAROTID ARTERY LIGATION

ENDOSCOPIC SPHENOPALATINE ARTERY LIGATION AND CAUTERISATION

It is the currently accepted treatment for managing persistent posterior epistaxis [50] .A control rate of up to 98% have been documented in pooled series of study.[75] In some study success rate of almost 100% have been reached [54].

One has to be aware of the anatomical variability before proceeding with surgery. The sphenopalatine artery normally starts to branch lateral to the ethmoid crest. Over 97% of individuals may have

two or more branches medial to the ethmoid crest, 67% have three or more branches, and 35% have four or more branches.[76] One study has specifically looked at the branching pattern from endoscopic surgeon's point of view.16% branched within the foramen and reached the nose together; in 42% the branches had an anteroposterior relationship, with the septal branch being posterior to the posterior nasal branch, and in the remaining 42%, the septal branch exited through a separate foramen posterior to the sphenopalatine foramen[51].

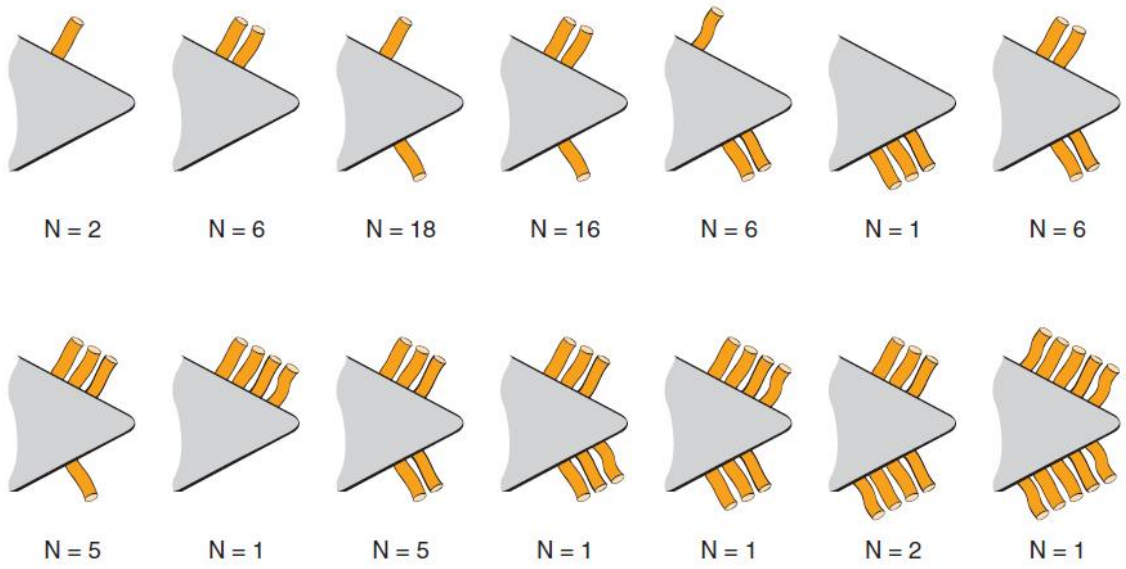


Figure 14

ILLUSTRATION REPRESENTING THE BRANCHING PATTERN OF SPHENOPALATINE ARTERY SUPERIOR AND INFERIOR TO ETHMOIDAL CREST.

A mucosal incision is made in the posterior fontanelle area, anterior to the horizontal part of the base of the middle turbinate as it joins the lateral nasal wall. Using a freer suction elevator or a round knife, the mucoperiosteal flaps are elevated. The elevation is started inferiorly and then superiorly. The crista ethmoidalis (present in 96% of cases[71]) of palatine bone is exposed. This is an important landmark for sphenopalatine foramen. The artery is found to run posterior to this bone through the sphenopalatine foramen[71]. Dissection is taken above and behind the pedicle. The anterior branch, found just posterior to the crest, is ligated with vascular clips or cauterized using BIPOLAR DIATHERMY and divided. This allows lifting of flap further superiorly to expose the posterior septal branch. Further branches are ligated or cauterised and divided in the same fashion. It is always necessary to cauterize the vessels as far as possible from the foramen to avoid possible retraction into the fossa. Finally at the end of the procedure, flaps are repositioned to hastens remucosalization and avoid packing.

Identifying all branches is the key in preventing recurrent episodes. Other complications[71] like crusting, decreased lacrimation, acute sinusitis, palatal numbness, nasal adhesions, septal perforations and Inferior turbinate necrosis [101] have been reported.

ARTERIAL EMBOLISATION

Sokoloff in 1974 performed the first Embolization. Embolization under angiographic guidance is an effective way of dealing with recurrent and refractory epistaxis [52, 53, 55]. Using Seldinger Femoral Angiography, bleeding vessel is identified, a fine catheter is passed into the Internal Maxillary Artery. Particles of tungsten, polyvinyl alcohol or steel microcoils are used for embolization.

It is used in patients unfit for surgery. It needs expertise in Interventional Radiology and has a risk of complications like Cerebrovascular accident, Hemiplegia, Facial nerve palsy, Ophthalmoplegia, Soft Tissue Necrosis and Seizures. It is extremely dangerous to embolise internal carotid arterial system as it carries the risk of embolization of ophthalmic artery leading on to blindness.

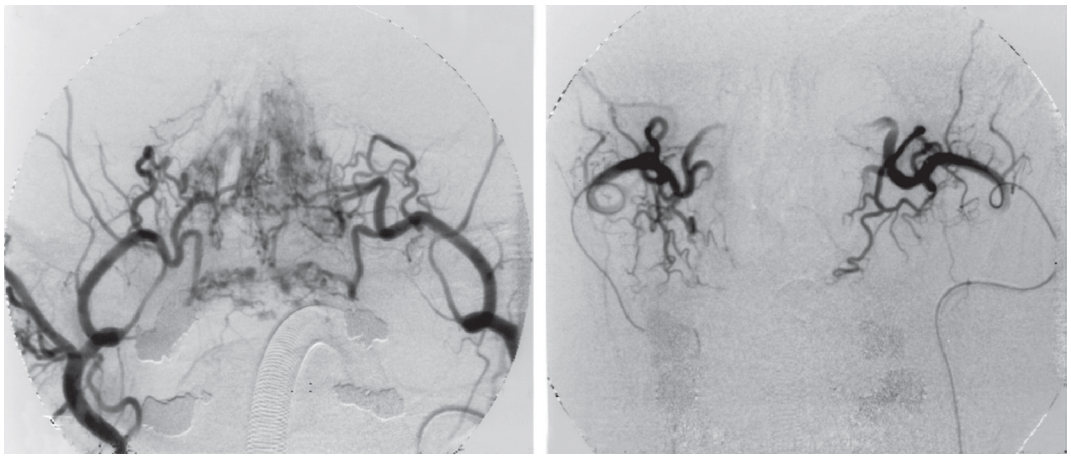
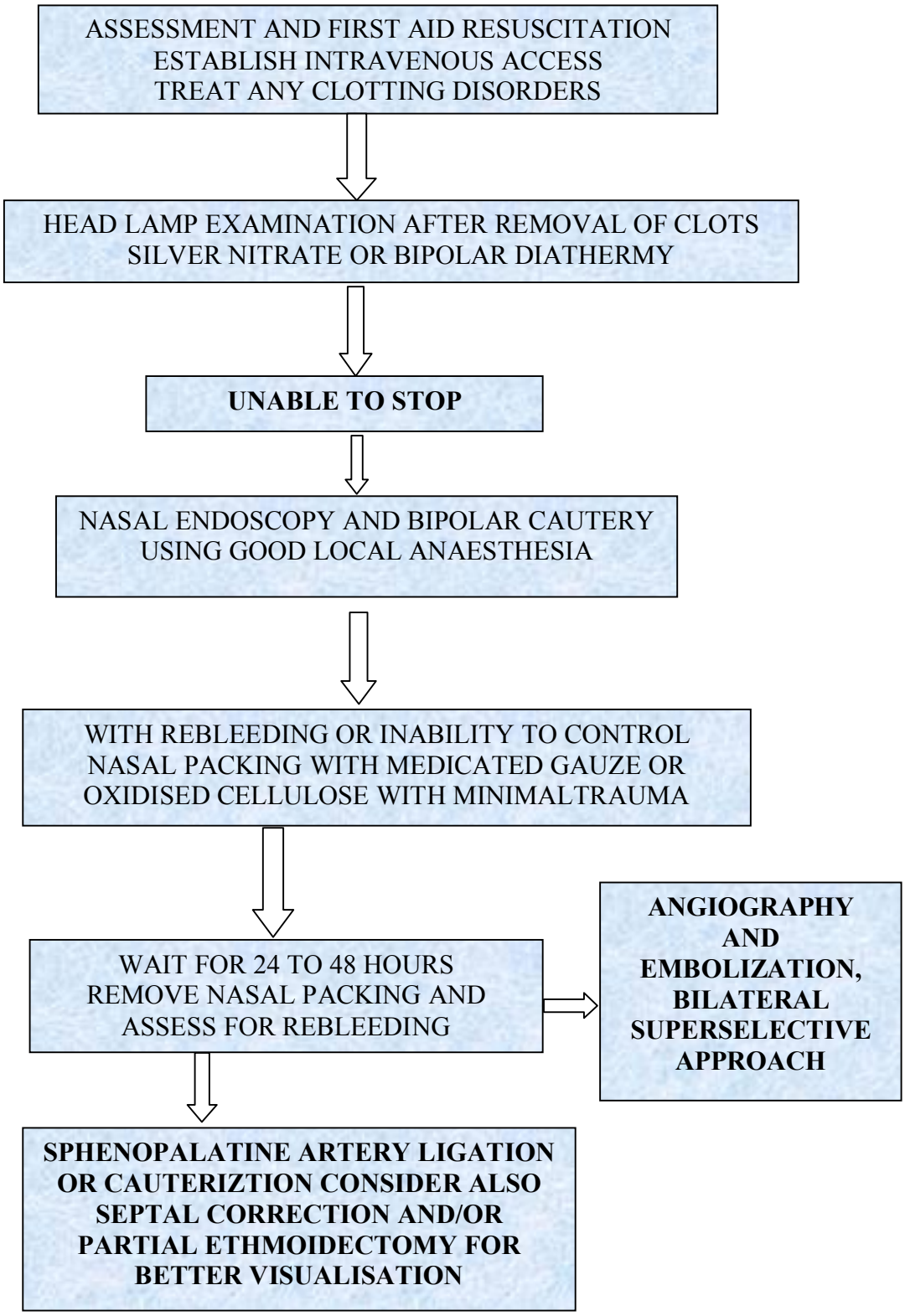


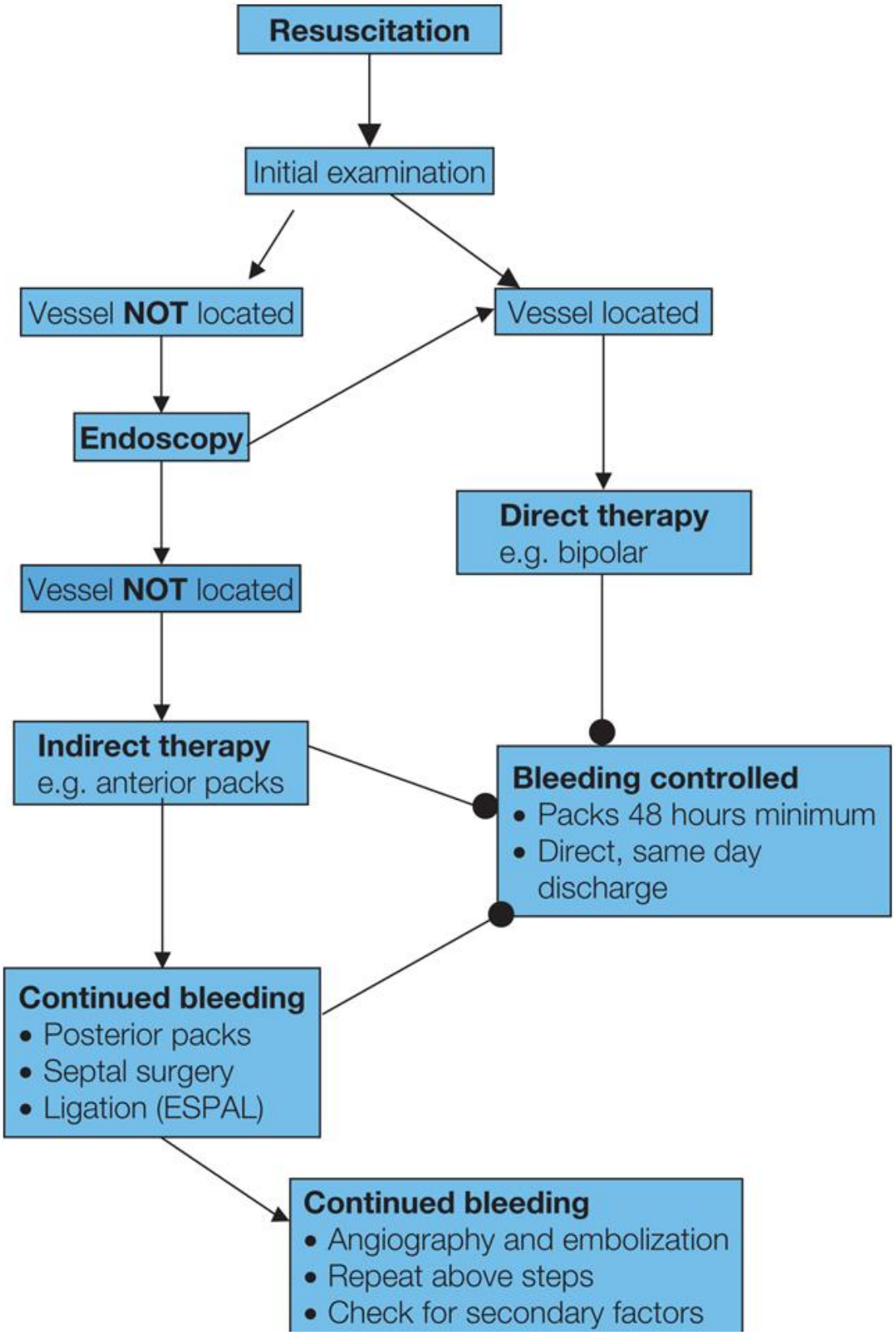
Figure 15

SPHENOPALATINE ARTERY-BEFORE AND AFTER EMBOLISATION

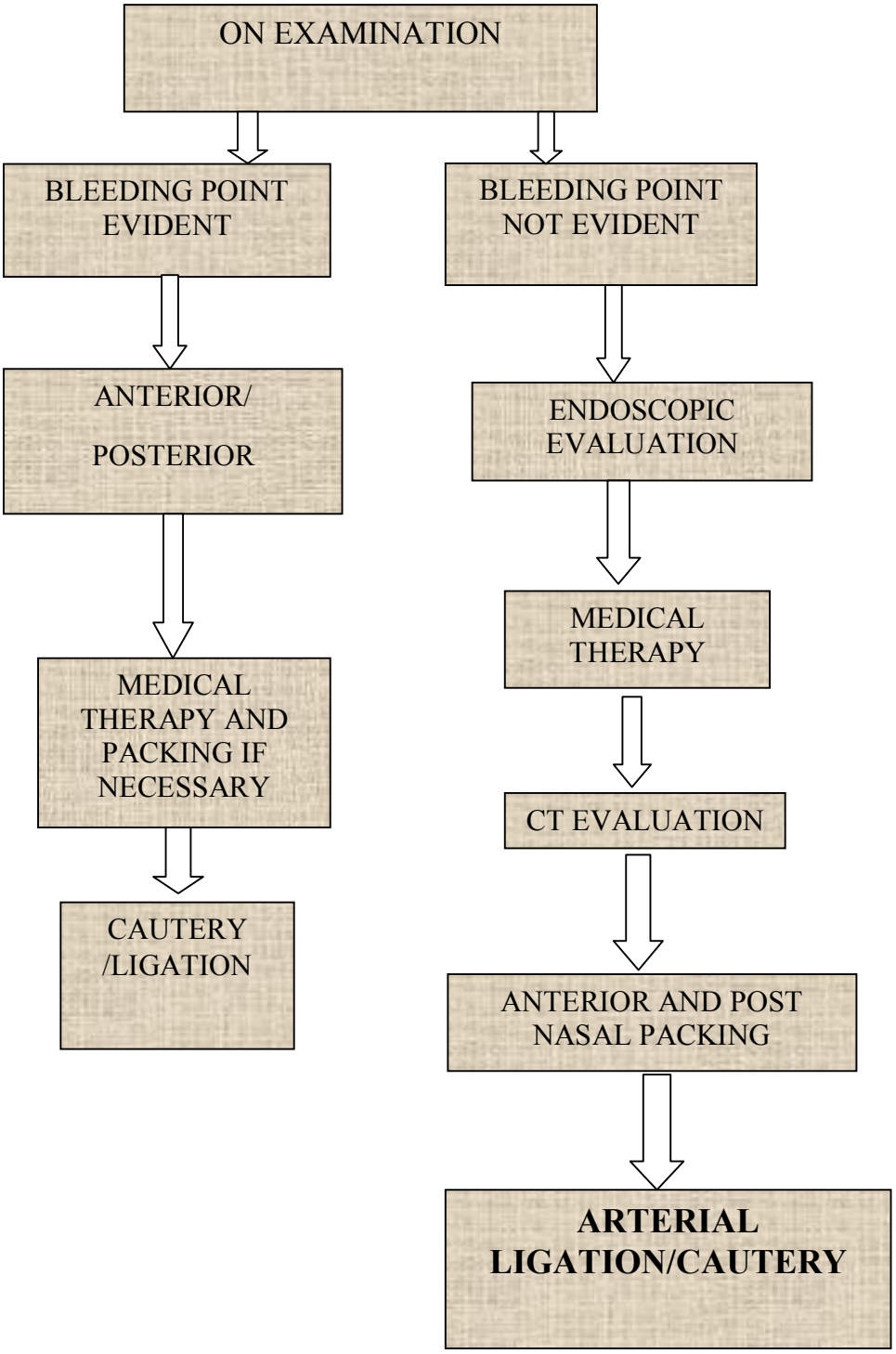
TREATMENT PROTOCOL FOR CONTROL OF EPISTAXIS IN EMERGENCY SETTING



MANAGEMENT STRATEGY FOR ADULT PRIMARY EPISTAXIS



MANAGEMENT STRATEGY FOR CHRONIC OR RECURRENT EPISTAXIS



MATERIALS AND METHODS

MATERIALS AND METHODS

A prospective interventional study was conducted in the Department of Otorhinolaryngology at Stanley Medical College from August 2014 to July 2015. Patients of both sexes between the age of 18 to 65 years who had history of recurrent and refractory epistaxis were taken up for the study.

A total of 415 patients with Epistaxis were evaluated by relevant history and appropriate investigations for various causes and treated by various methods. In this study patients with recurrent and refractory posterior epistaxis alone were chosen.

If the patient presents with bleeding, first aid measure of applying constant firm pressure over the lower bony part of the nose for 20 minutes and to lean forward with the mouth open on a bowl is done. Anterior and post nasal packing by Foley's catheter was done as the first line of management. Additionally, haemostatic agents were given and evaluated for cause of epistaxis by various Investigations and Imaging.

If the patient doesn't present with bleeding they are admitted and evaluated for cause of bleeding.

If the patient presents with torrential bleeding, all conservative measures are tried and if found refractory they are taken up for surgery on emergency basis.

Hypertensive patients were monitored for blood pressure and the same controlled by anti-hypertensives and anxiolytics according to cardiologist or physician opinion. Diabetic patients were treated accordingly.

Meanwhile a thorough history on duration, frequency, side, trauma, fever, repeated episodes was obtained and clinical examination was done to get an idea of septal deviations, spur, turbinate hypertrophy, condition of the mucosa, any mass or polyps . Packs removed after 24 -48 hours, DNE done to ascertain the site and observed for further episodes. All cases of anterior epistaxis are managed accordingly and excluded from the study.

A total number of 23 patients with recurrent and refractory posterior epistaxis underwent TRANSNASAL ENDOSCOPIC SPHENOPALATINE ARTERY CAUTERIZATION and followed up periodically for three months. Arterial ligation with vascular clips was not done due to its unavailability.

INCLUSION CRITERIA

1. Age 18-65 years

2. Patients diagnosed with recurrent posterior epistaxis, posterior epistaxis not controlled by medical treatment and conventional nasal packing

EXCLUSION CRITERIA

1. Age <18 or >65years of both sex

2. Sino nasal infections and inflammatory conditions

3. Due to mass lesions of the nose, nasopharynx and paranasal sinuses including malignancy

4. Vascular malformations of the nose

5. Bleeding diathesis

6. Patients on Anticoagulant therapy

7. Immunocompromised patients

8. Renal diseases

9. Liver diseases

PRE OPERATIVE PREPATATION

A formal pre op counselling was given and an informed and written consent were obtained for surgery. Consent regarding their participation in the study was obtained.

PROCEDURE

ANAESTHESIA- It can be done under General or Local Anaesthesia

In our institution all the cases were done under General Anaesthesia.

Total IntraVenous Anaesthesia (TIVA) due to reduced blood loss.

INFILTRATION

10 ml of 2% lignocaine premixed with 1in 80000 adrenaline for infiltration

10 ml of 4% lignocaine with one ampoule of 1in1000 adrenaline for topical vasoconstriction.

POSITION

Supine with 15 degree head end elevation (anti-Trendelenberg position). Patient's head in neutral position (neither flexed nor extended).

SURGERY

Infiltrations are given in the sphenopalatine region on one side or both sides, over the axilla of middle turbinate, uncinate process, and both sides of the septum if needed.

Both middle meati and entire nasal cavity are packed with decongestant nasal packs for twenty minutes and removed. The sphenopalatine artery is identified and cauterized as previously mentioned, and divided.

In cases with septal deviation ,spur, inferior turbinate hypertrophy, which limits access to the sphenopalatine area, sub mucosal resection of septum or septal correction, spurectomy, partial inferior turbinectomy were done respectively before arterial cauterization.

Similarly, in selected cases a prior Middle Meatal Antrostomy was done for easy identification and elevation of the mucoperiosteal flaps.

Nasal packing was done, if necessary, using ointment roller gauze packs similar to conventional Endoscopic Sinus Surgery. Patient recovered from General anaesthesia, extubated and shifted to recovery room and then to ward.

POST OP MONITORING

Patients in head up position

Nil oral by mouth for 3 to 4 hours

Pulse and Blood Pressure monitoring periodically especially for Hypertensive patients

Management of Diabetes

INSTRUCTIONS

Patients were observed in ward and discharged after three days. Nasal packs, if any were removed after 24 hours. Saline nasal drops were given to loosen the crusts and to promote healing.

Almost all cases were discharged on third postoperative day.

Advice given:

Avoid forcible blowing of nose and lifting heavy objects for a week.Saline nasal douche advised for three weeks in cases undergoing additional procedures.

Decongestant nasal drops like xylometazoline or oxymetazoline for one week.

All patients were followed up after one week, three weeks, four weeks, interval for removal of crusts and discharge Endoscopically, and once in every month for a period of three months. They were monitored for further episodes of Epistaxis.

They were informed about the mucosal healing that takes about 4-8 weeks.

Medical therapy with topical saline and decongestants, and oral antibiotics were given in the post op period to prevent crusting and infection. Patients are advised to quit smoking and alcohol.

STATISTICAL ANALYSIS

STATISTICAL ANALYSIS

The collected data was analysed with SPSS 16.0 version. To describe about the data descriptive statistics frequency analysis, percentage analysis were used for categorical variables and the mean & S.D. were used for continuous variables.

A total of 415 patients with epistaxis were managed on outpatient and inpatient basis. 23 patients among them required TRANSNASAL ENDOSCOPIC SPHENOPALATINE ARTERY CAUTERIZATION.

DISCRIPTIVE STASTISTICS WITH FREQUENCY ANALYSIS

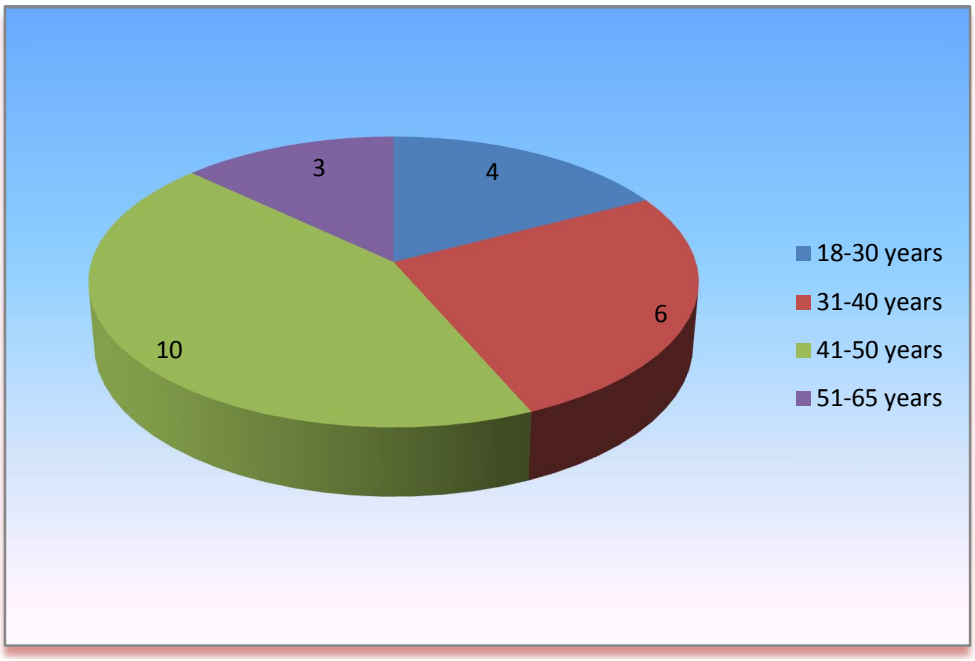
TABLE – 1

AGE DISTRIBUTION

NO. OF PATIENTS	MINIMUM AGE	MAXIMUM AGE	MEAN	STD. DEVIATION
23	22	60	41.39	10.404

The range of age varied from 23 years and 60 years with a mean of 41 years.

AGE DISTRIBUTION



43.5% of the patients were between the ages of 41-50 years.

GENDER DISTRIBUTION

TABLE – 2

MALE

NO. OF PATIENTS	MINIMUM AGE	MAXIMUM AGE	MEAN	STD. DEVIATION
17	22	60	41.59	11.790

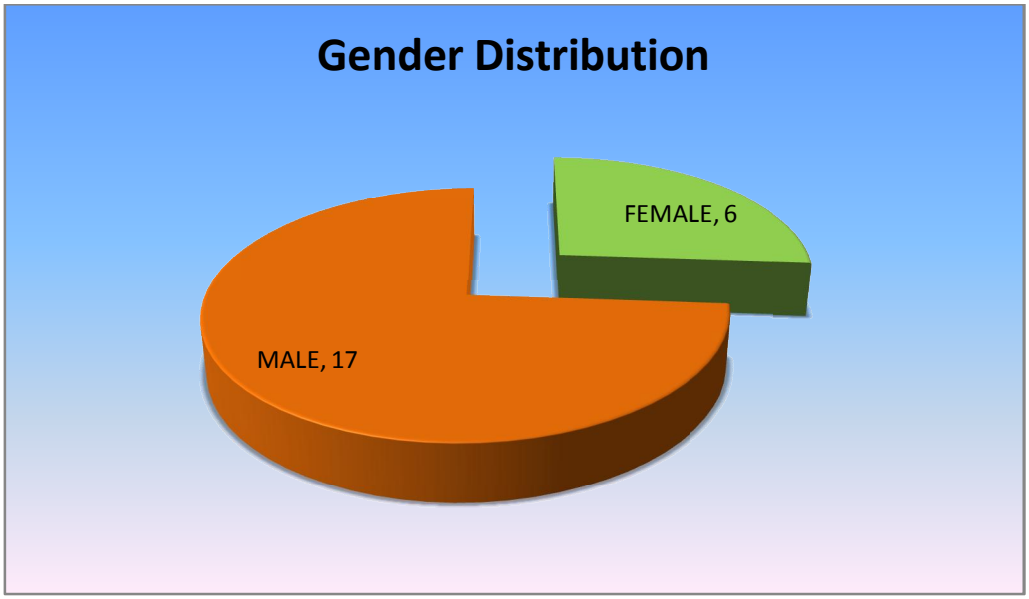
TABLE – 3

FEMALE

NO. OF PATIENTS	MINIMUM AGE	MAXIMUM AGE	MEAN	STD. DEVIATION
6	33	48	40.83	5.565

TABLE – 4

GENDER	FREQUENCY	PERCENT	VALID PERCENT	CUMULATIVE PERCENT
FEMALE	6	26.1	26.1	26.1
MALE	17	73.9	73.9	100.0
Total	23	100.0	100.0	

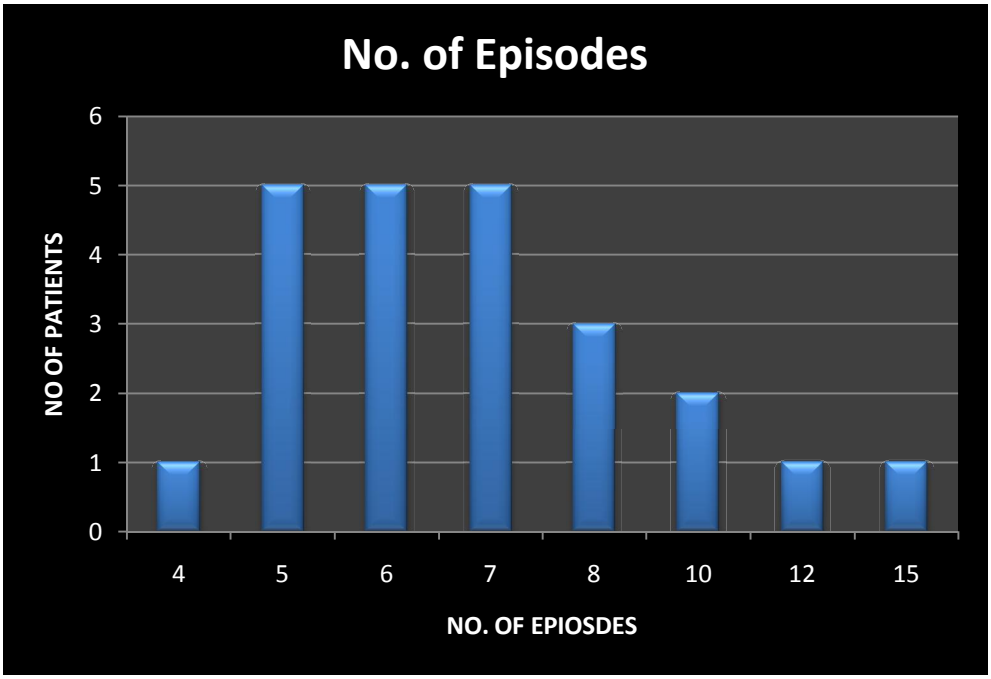


Among 23 patients, 17 were male (74%) and 6 were female (26. %).

TABLE - 5

NUMBER OF EPISODES

NO. OF EPISODES	NO. OF PATIENTS	PERCENTAGE OF PATIENTS	VALID PERCENTAGE	CUMULATIVE PERCENTAGE
4	1	4.3	4.3	4.3
5	5	21.7	21.7	26.1
6	5	21.7	21.7	47.8
7	5	21.7	21.7	69.6
8	3	13.0	13.0	82.6
10	2	8.7	8.7	91.3
12	1	4.3	4.3	95.7
15	1	4.3	4.3	100.0
Total	23	100.0	100.0	

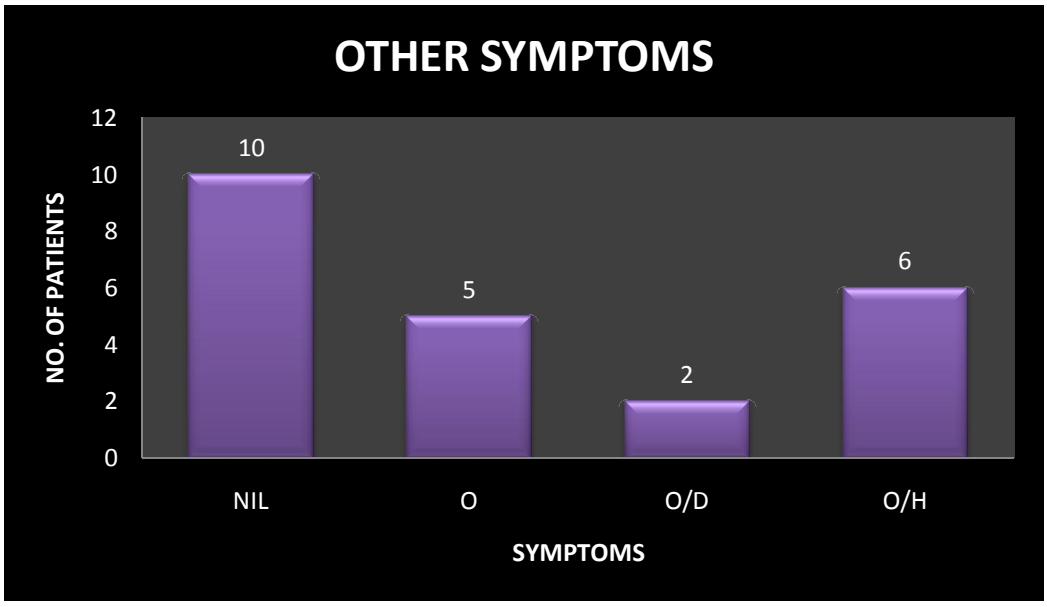


In this study, all patients had more than one episode of bleeding with one patient having a maximum of 15 episodes.

TABLE – 6

OTHER SYMPTOMS

	FREQUENCY	PERCENT	VALID PERCENT	CUMULATIVE PERCENT
NO OTHER SYMPTOMS	10	43.5	43.5	43.5
OBSTRUCTION	5	21.7	21.7	65.2
OBSTRUCTION WITH DISCHARGE	2	8.7	8.7	73.9
OBSTRUCTION WITH HEADACHE	6	26.1	26.1	100.0
TOTAL	23	100.0	100.0	



O – Nasal Obstruction D – Nasal Discharge

H – Headache O/D- Nasal Obstruction with Discharge

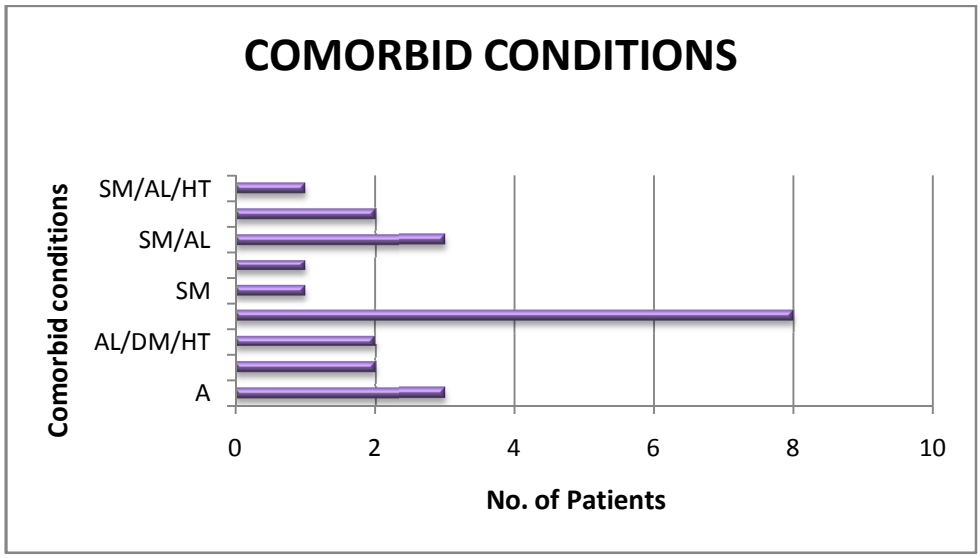
O/H- Nasal Obstruction with Headache

Nasal obstruction was the common associated symptom in most of the cases.

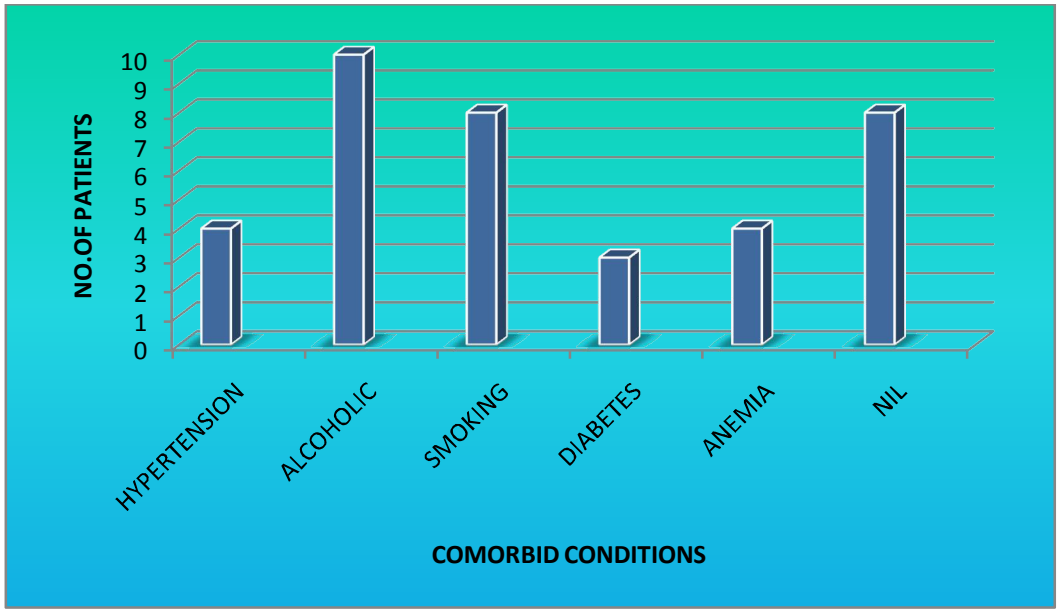
TABLE - 7

CO MORBID CONDITIONS

COMORBID CONDITIONS	FREQUENCY	PERCENT	VALID PERCENT	CUMULATIVE PERCENT
ANEMIA	3	13.0	13.0	13.0
ALCOHOLISM	2	8.7	8.7	21.7
ALCOHOLISM/ DIABETES/ HYPERTENSION	2	8.7	8.7	30.4
SMOKING	1	4.3	4.3	69.6
SMOKING/ ANEMIA	1	4.3	4.3	73.9
SMOKING/ ALCOHOLISM	3	13.0	13.0	87.0
SMOKING/ ALCOHOLISM/ DIABETES/ HYPERTENSION	2	8.7	8.7	95.7
SMOKING/ ALCOHOLISM/ HYPERTENSION	1	4.3	4.3	100.0
NIL CONDITION	8	34.8	34.8	65.2
TOTAL	23	100.0	100.0	



INDIVIDUAL COMORBID CONDITIONS



SM – Smoking, AL – Alcoholic, DM – Diabetes, HT – Hypertension, A - Anaemia

Increased blood pressure was observed in 4 patients with long standing history.

10 patients were Alcoholic and for more than ten years.

3 patients were Diabetic. Two patients had blood sugar under control pre operatively. One patient had uncontrolled diabetes managed with insulin and later changed to oral hypoglycaemic drugs.

8 patients were Smokers with history of more than 5 years of smoking.

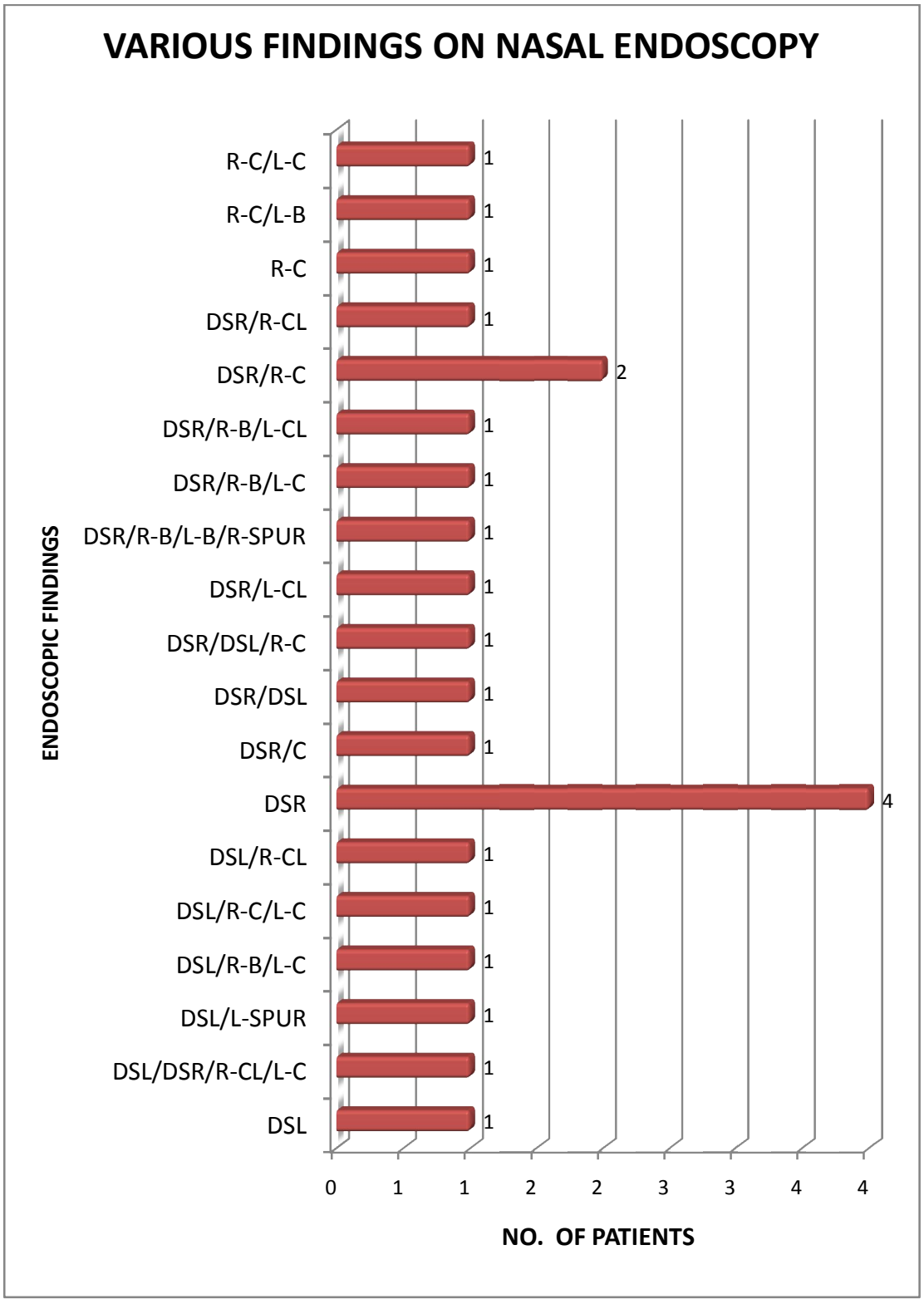
TABLE – 8

ENDOSCOPIC FINDINGS

FINDINGS	FREQUENCY	PERCENT	VALID PERCENT	CUMULATIVE PERCENT
DSL	1	4.3	4.3	4.3
DSL/DSR/R-CL/L-C	1	4.3	4.3	8.7
DSL/L-SPUR	1	4.3	4.3	13.0
DSL/R-B/L-C	1	4.3	4.3	17.4
DSL/R-C/L-C	1	4.3	4.3	21.7
DSL/R-CL	1	4.3	4.3	26.1
DSR	4	17.4	17.4	43.5
DSR/C	1	4.3	4.3	47.8
DSR/DSL	1	4.3	4.3	52.2
DSR/DSL/R-C	1	4.3	4.3	56.5
DSR/L-CL	1	4.3	4.3	60.9
DSR/R-B/L-B/R-SPUR	1	4.3	4.3	65.2
DSR/R-B/L-C	1	4.3	4.3	69.6
DSR/R-B/L-CL	1	4.3	4.3	73.9
DSR/R-C	2	8.7	8.7	82.6
DSR/R-CL	1	4.3	4.3	87.0
R-C	1	4.3	4.3	91.3
R-C/L-B	1	4.3	4.3	95.7
R-C/L-C	1	4.3	4.3	100.0
Total	23	100.0	100.0	

DSL-DEVIATED SEPTUM TO LEFT, **DSR**- DEVIATED SEPTUM TO RIGHT

R-RIGHT, **L**-LEFT, **C**-CONGESTION, **CL**-CLOTS, **B**-BLEEDING


VARIOUS FINDINGS ON NASAL ENDOSCOPY
ENDOSCOPIC FINDINGS
R-C/L-C
R-C/L-B
R-C
DSR/R-CL
DSR/R-C
DSR/R-B/L-CL
DSR/R-B/L-C
DSR/R-B/L-B/R-SPUR
DSR/L-CL
DSR/DSL/R-C
DSR/DSL
DSR/C
DSR
DSL/R-CL
DSL/R-C/L-C
DSL/R-B/L-C
DSL/L-SPUR
DSL/DSR/R-CL/L-C
DSL
1
1
1
1
2
1
1
1
1
1
1
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4
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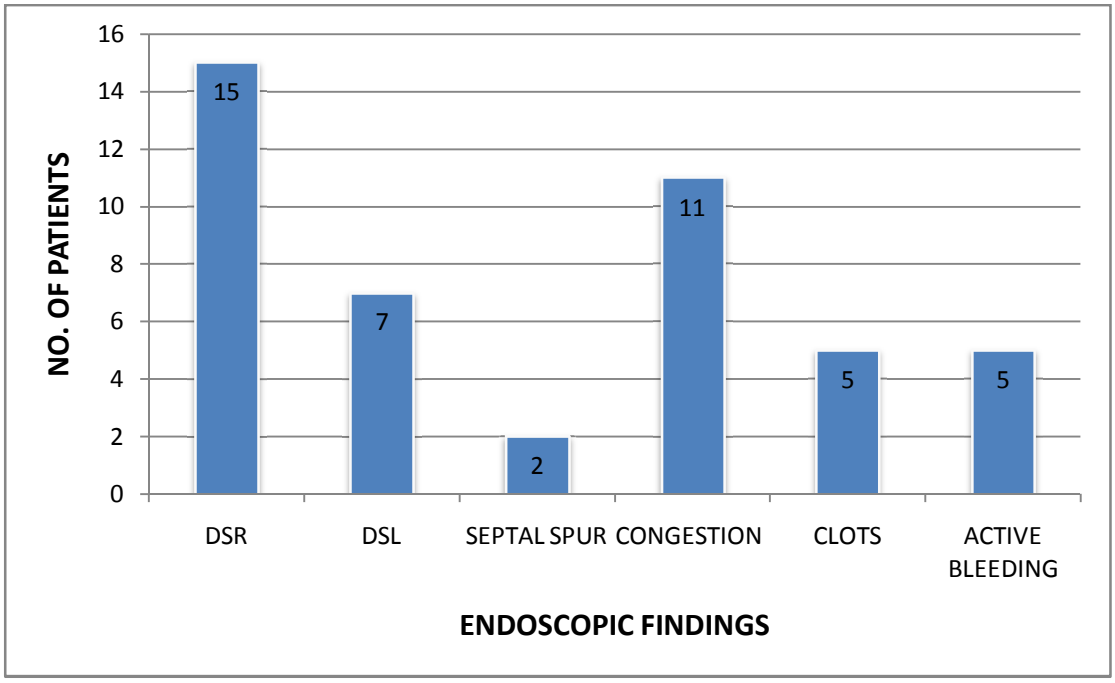
0 1 1 2 2 3 3 4 4
NO. OF PATIENTS

DISTRIBUTION OF INDIVIDUAL FINDINGS IN PATIENTS

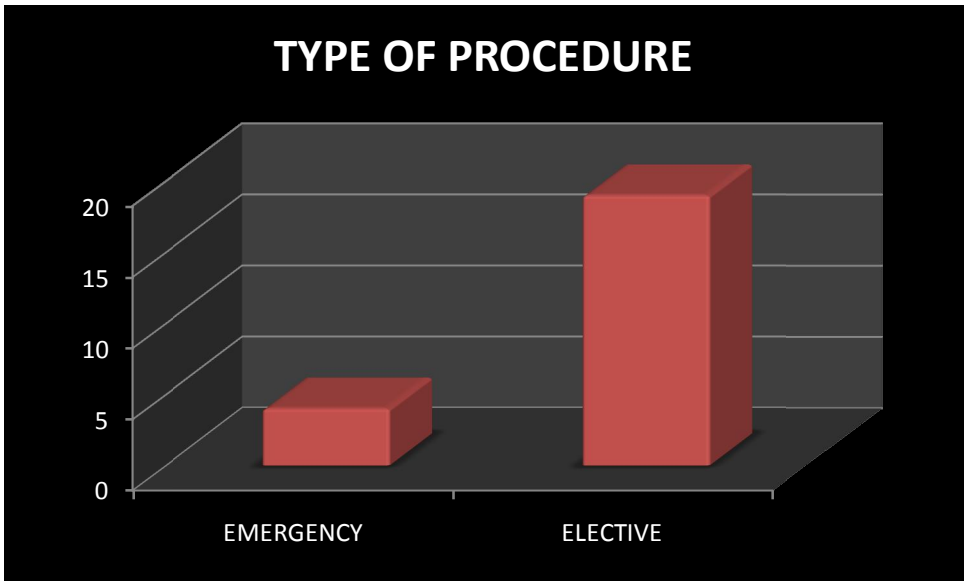


Five patients presented with active bleeding in whom four underwent an emergency procedure. Septal deviation was a common finding most of which required septal surgery for ease of access to sphenopalatine area. Congestion in the posterior part of nasal cavity or SPA region was present in 11 patients.

TABLE – 9

TYPE OF PROCEDURE

TYPE OF PROCEDURE	FREQUENCY	PERCENT	VALID PERCENT	CUMULATIVE PERCENT
EMERGENCY	4	17.4	17.4	17.4
ELECTIVE	19	82.6	82.6	100.0
TOTAL	23	100.0	100.0	

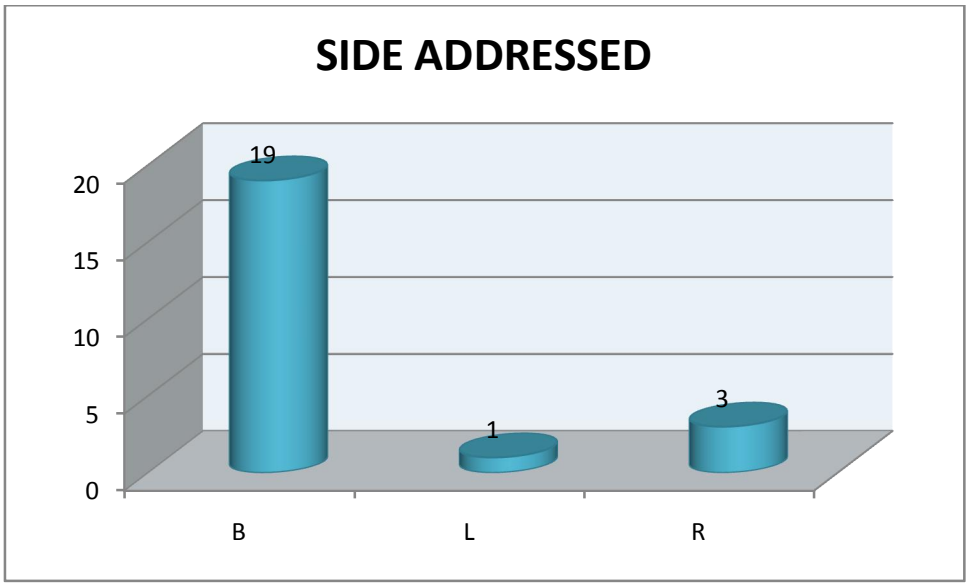


4 patients needed an emergency arterial cauterization under Total Intravenous Anaesthesia due to profuse UNCONTROLLED bleeding.

TABLE – 10

SIDE OF NASAL CAVITY ADDRESSED

SIDE ADDRESSED	FREQUENCY	PERCENT	VALID PERCENT	CUMULATIVE PERCENT
BILATERAL	19	82.6	82.6	82.6
LEFT	1	4.3	4.3	87.0
RIGHT	3	13.0	13.0	100.0
TOTAL	23	100.0	100.0	



B-BOTH SIDES R-RIGHT L-LEFT

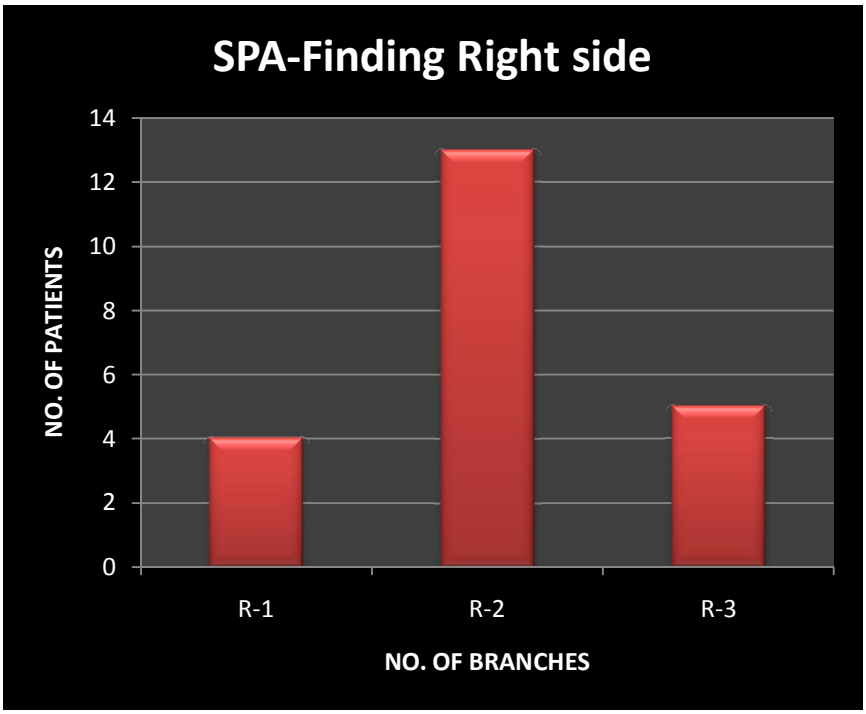
19 patients underwent bilateral procedure as the exact side could not be ascertained. 3 patients had it done only on right side and 1 patient only on left side.

INTRA OP FINDINGS OF SPHENOPALATINE ARTERY SHOWING NUMBER OF BRANCHES

TABLE – 11

RIGHT SIDE SPA-FINDINGS

NO. OF BRANCHES	FREQUENCY	PERCENT	VALID PERCENT	CUMULATIVE PERCENT
1	4	17.4	18.2	18.2
2	13	56.5	59.1	77.3
3	5	21.7	22.7	100.0
TOTAL	22	95.7	100.0	
RT SIDE NOT DONE	1	4.3		
TOTAL	23	100.0		



R - RIGHT

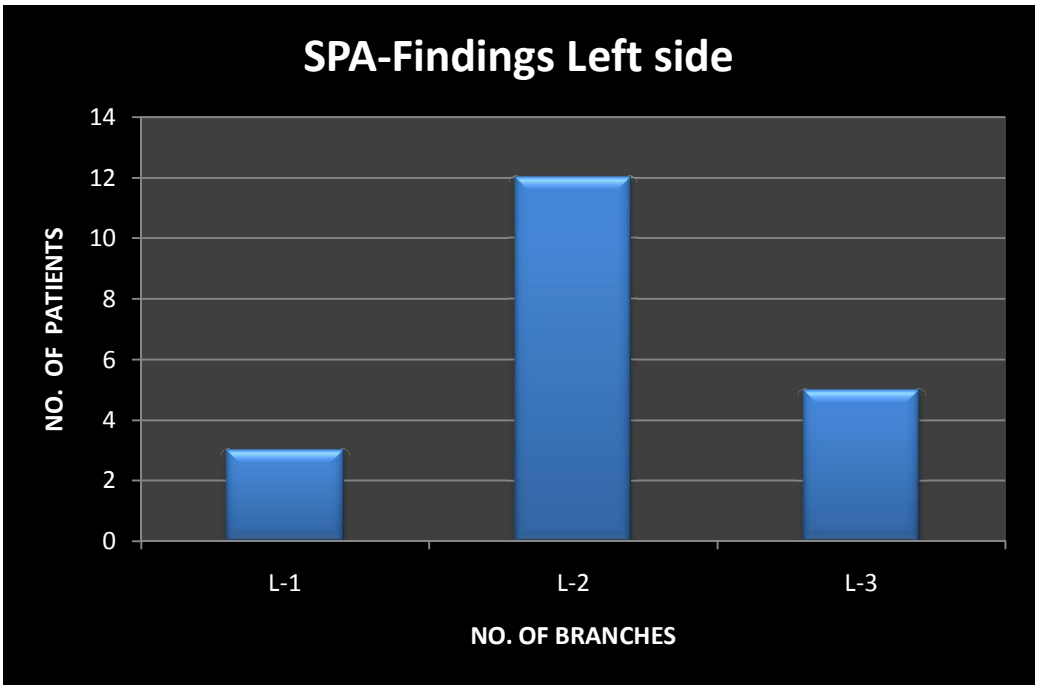
OUT OF 23 PATIENTS, RIGHT SIDE WAS ADDRESSED IN 22.

ONE EXCLUSIVELY ON LEFT SIDE

TABLE - 12

LEFT SIDE SPA-FINDINGS

NO. OF BRANCHES	FREQUENCY	PERCENT	VALID PERCENT	CUMULATIVE PERCENT
1	3	13.0	15.0	15.0
2	12	52.2	60.0	75.0
3	5	21.7	25.0	100.0
TOTAL	20	87.0	100.0	
LT SIDE NOT DONE	3	13.0		
TOTAL	23	100.0		



L - LEFT

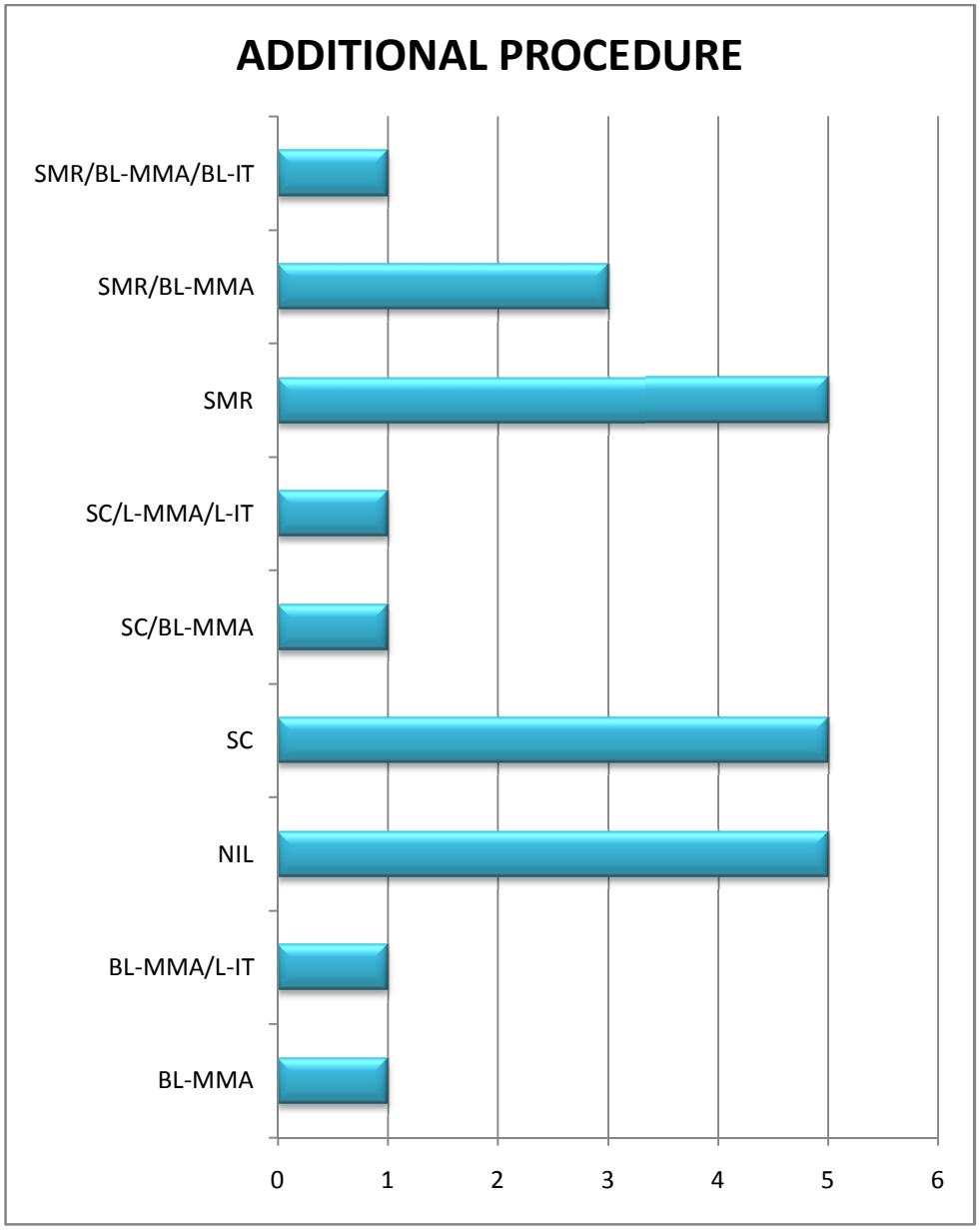
OUT OF 23 PATIENTS, 20 PATIENTS UNDERWENT CAUTERIZATION ON LEFT SIDE. 3 EXCLUSIVELY ON RIGHT SIDE.

A total of 42 sphenopalatine arteries with its branches were cauterized in this study. Most of the patients had two branch patterns. All were identified individually, cauterised and divided. We encountered a maximum of three branches in few patients.

TABLE – 13

ADDITIONAL PROCEDURES REQUIRED

ADDITIONAL PROCEDURES	FREQUENCY	PERCENT	VALID PERCENT	CUMULATIVE PERCENT
BL-MMA	1	4.3	4.3	4.3
BL-MMA/L-IT	1	4.3	4.3	8.7
NIL	5	21.7	21.7	30.4
SC	5	21.7	21.7	52.2
SC/BL-MMA	1	4.3	4.3	56.5
SC/L-MMA/L-IT	1	4.3	4.3	60.9
SMR	5	21.7	21.7	82.6
SMR/BL-MMA	3	13.0	13.0	95.7
SMR/BL-MMA/BL-IT	1	4.3	4.3	100.0
Total	23	100.0	100.0	

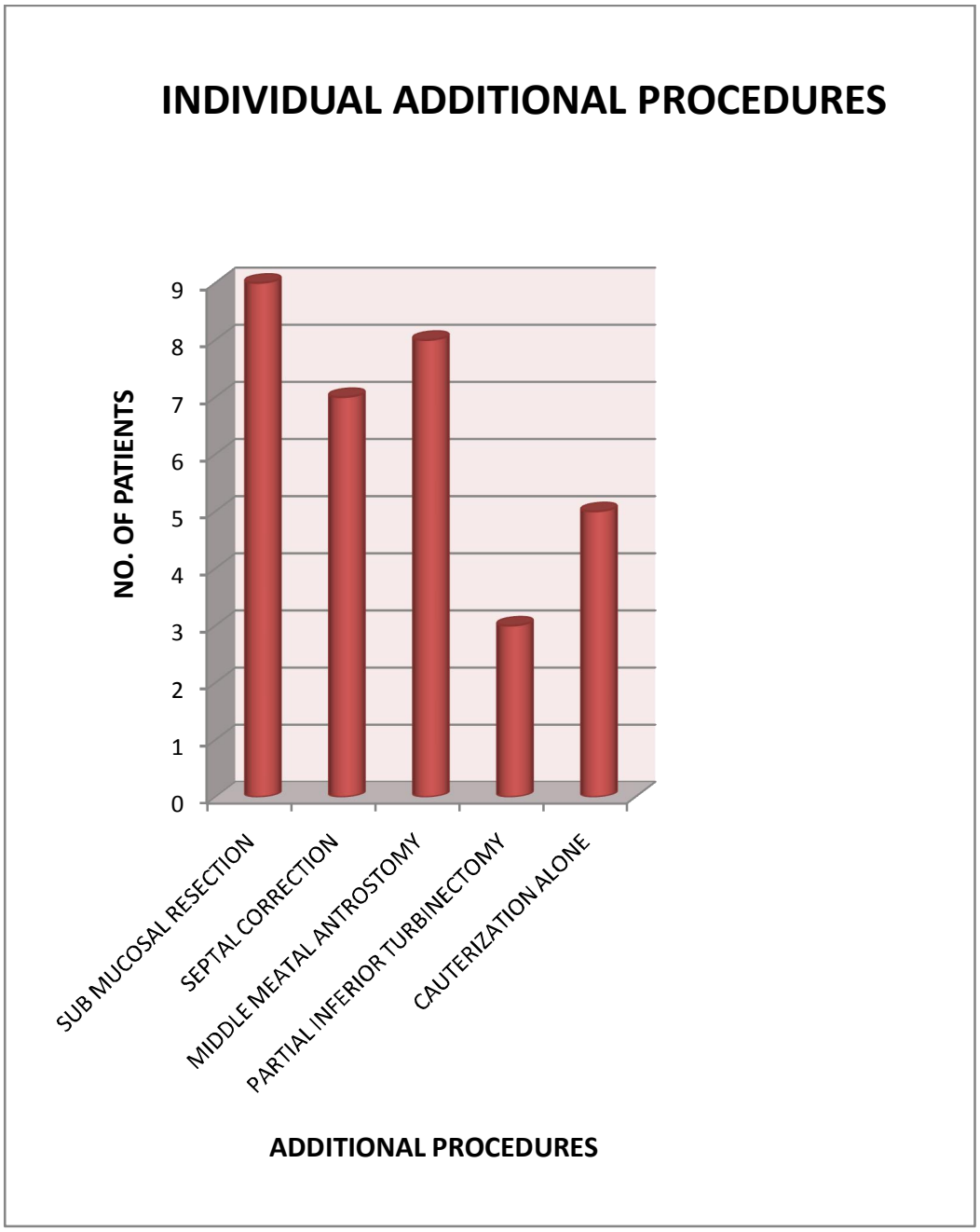


BL-BILATERAL, MMA-MIDDLE MEATAL ANTROSTOMY,

IT-PARTIAL INFERIOR TURBINECTOMY,

SC-SEPTAL CORRECTION, SMR-SUB MUCOSAL RESECTION

OF SEPTUM, R – RIGHT, L – LEFT



Sub Mucosal Resection of septum and Septal Corrections were the additional procedures commonly done (in 16 patients) to access the Sphenopalatine region.

TABLE – 14

FOLLOW UP AT 1 WEEK

ENDOSCOPIC EXAMINATION	FREQUENCY	PERCENT	VALID PERCENT	CUMULATIVE PERCENT
NO BLEEDING	23	100.0	100.0	100.0

TABLE – 15

FOLLOW UP AT 3 WEEKS

ENDOSCOPIC EXAMINATION	FREQUENCY	PERCENT	VALID PERCENT	CUMULATIVE PERCENT
L-BLEEDING	1	4.3	4.3	4.3
NO BLEEDING	21	95.6	95.6	100.0
TOTAL	23	100.0	100.0	

L – LEFT SIDE

TABLE – 16

FOLLOW UP AT 4 WEEKS

ENDOSCOPIC EXAMINATION	FREQUENCY	PERCENT	VALID PERCENT	CUMULATIVE PERCENT
NO BLEEDING	23	100	100	100

TABLE - 17

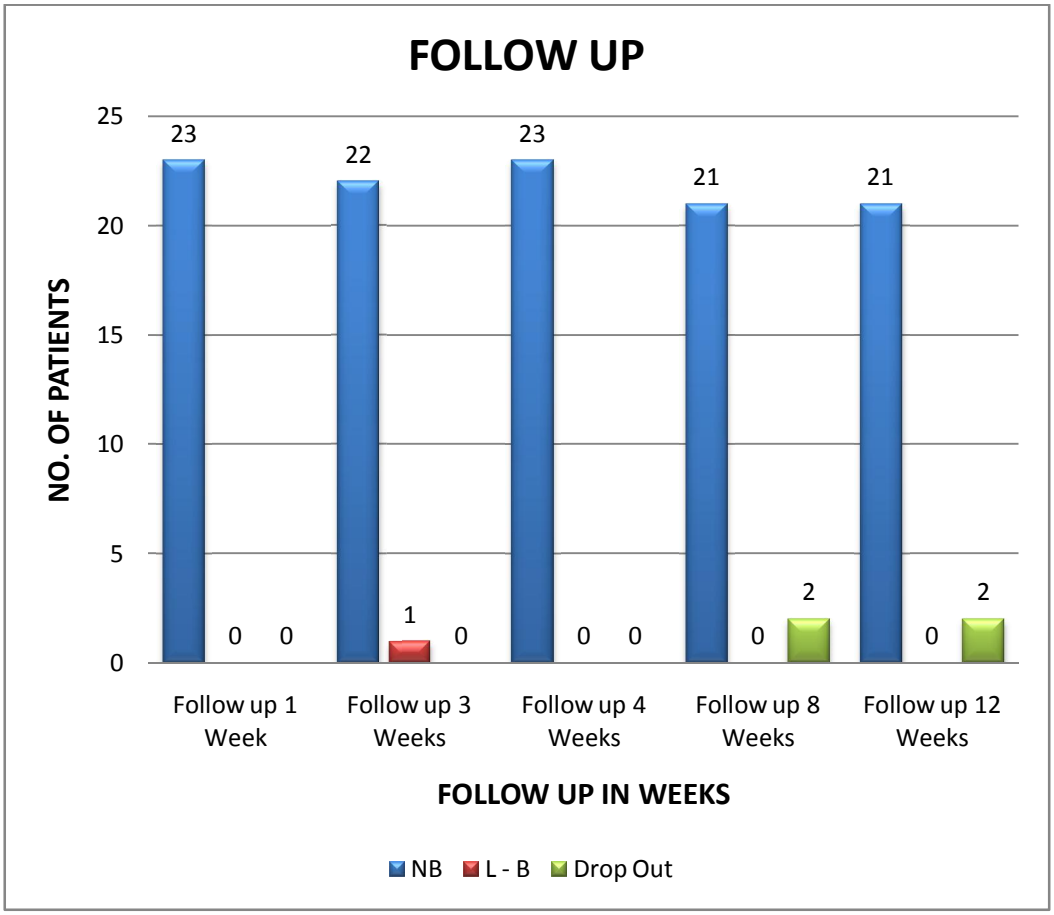
FOLLOW UP AT 8 WEEKS

ENDOSCOPIC EXAMINATION	FREQUENCY	PERCENT	VALID PERCENT	CUMULATIVE PERCENT
NO BLEEDING	21	95.6	95.6	95.6
NO FOLLOW UP	2	4.3	4.3	100
TOTAL	23	100	100	

TABLE - 18

FOLLOW UP AT 12 WEEKS

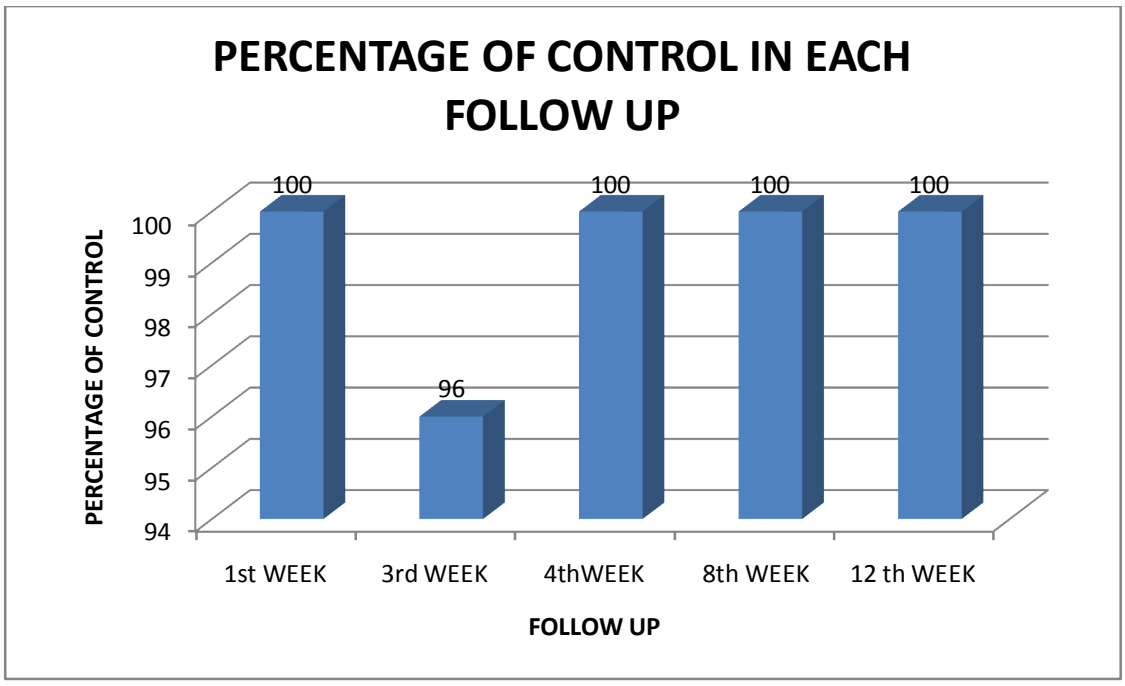
ENDOSCOPIC EXAMINATION	FREQUENCY	PERCENT	VALID PERCENT	CUMULATIVE PERCENT
NO BLEEDING	21	91.3	91.3	91.3
NO FOLLOW UP	2	8.7	8.7	100.0
TOTAL	23	100.0	100.0	



Only one patient who underwent left sided CAUTERIZATION, septal correction with left middle meatal antrostomy and left inferior turbinectomy had a recurrent episode at third week. It was controlled by anterior nasal packing. On nasal endoscopy no obvious pathology was made out. No further episodes were reported.

PERCENTAGE OF CONTROL IN EACH FOLLOW UP

OBSERVATION IN EACH FOLLOW UP	1ST WEEK	3RD WEEK	4TH WEEK	8TH WEEK	12TH WEEK
NO BLEEDING	23	22	23	21	21
BLEEDING	0	1	0	0	0
DROP OUT	0	0	0	2	2
PERCENTAGE OF CONTROL	100	96	100	100	100



Two patients did not come for follow up after 4 weeks. Control Rates are estimated for each follow up for the entire period of study. Thus the average control rate was 99.2% in this study.

RESULTS

RESULTS

A total of 415 patients with epistaxis were treated in our hospital from the period of August 2014 to July 2015. Among them 392 patients (94.5%) were treated by conservative management. Only 23 patients (5.5%) needed surgery.

Among 23 patients, 17 were male and 6 were female. 10 patients were between the ages of 41-50 years. The mean age was 41years.

4 patients were Anaemic (17.4 %).

Hypertension was observed in 4 patients (17.4%) with long standing history.

10 patients (43.5%) were alcoholic for more than ten years.

Liver function tests and Coagulation Profile including Direct and Total Bilirubin, Liver transaminases (AST /SGOT and ALT/SGPT), Bleeding Time, Clotting Time, Prothrombin Time, Activated Partial Thromboplastin Time, INTERNATIONAL NORMALIZED RATIO (INR) were normal in this study. Chronic alcoholics with no abnormalities in Liver Function Tests and Coagulation Profile had recurrent or refractory epistaxis.

3 patients (13%) were diabetic. Two patients had blood sugar under control pre operatively. One patient had uncontrolled diabetes managed with insulin and later changed to oral hypoglycaemic drugs.

8 patients (34.8%) were smokers with history of more than 5 years of smoking.

Endoscopy examination showed congestion, bleeding, clots in sphenopalatine area, and posterior part of middle meatus and posterior nasal septum. Five of them presented with profuse bleeding among which four underwent Emergency Cauterization.

CT scan showing minimal mucosal thickening of the paranasal sinuses and septal deviations were a common finding.

Anatomical variations like Deviated Nasal Septum, Septal Spur and Inferior Turbinate Hypertrophy was present in almost all patients. All were addressed only for improving access to sphenopalatine area. Only partial Inferior Turbinectomy was done, if needed, to preserve mucosa.

The anatomical variations in branching pattern of sphenopalatine artery was evident from the study. 19 patients (82.6 %) underwent cauterization on both sides.

4 patients (17.4%) underwent on one side (3 on right side and 1 on left side). 4 patients were immediately taken up for surgery on Emergency Basis due to profuse bleeding and failure to arrest it by conventional anterior and postnasal packing by Foley's catheter. A total of 42 sides was addressed in this study.

Nasal packing was removed on the first post operative day. Saline nasal drops and decongestants were prescribed for two weeks. All cases were followed up every week for first three weeks for endoscopic removal of crusts and discharge and then every month for three months.

22 patients had control of epistaxis in the three month follow up period. One patient had bleeding in the operated side at three weeks post surgery. Anterior and post nasal pack was done and further evaluated for recurrence. He had no further episodes thereafter.

22 patients were discharged on the third post operative day. One patient with uncontrolled diabetes was discharged after one week post surgery for diabetes control. Rest had uneventful post operative period.

Two patients had not turned up for review after four weeks. Others had no recurrence in the entire period of study.

None of the patients had other complications like crusting, palatal numbness, , decreased lacrimation, acute sinusitis, septal perforation and synechiae.

In this study, the success rate of controlling epistaxis was 99.2%. Further follow up has been continued to ascertain a long term result.

DISCUSSION

DISCUSSION

Management by conservative measures remains the main stay of treatment in most cases of epistaxis. It can be difficult at times when it bleeds from posterior part of nasal cavity.

There are various treatment options like Anterior nasal packing, Post nasal packing, Chemical Cautery, Septoplasty, Septal correction with Bilateral flap elevation, Removal of Septal Spur, Ligation or Cauterization of anterior and posterior Ethmoidal Artery, Internal Maxillary Artery Ligation, External Carotid Aartery Ligation, Sphenopalatine Artery Ligation or Cauterization and Selective Arterial Embolization.

Anterior and post nasal packing with ribbon gauze and petroleum jelly and Foleys catheter as a tamponade has complications [62,63] like pain and discomfort, synechiae, peri orbital cellulitis, sinusitis, alar necrosis, syncope, apnoea, hypoxia, Toxic Shock Syndrome, Angina, Myocardial Infarction, Septal Perforation, Otitis Media, Obstructive Sleep Apnoea and Aspiration[58,59,60]. Apnoea and hypoxia observed with post nasal packing was ascribed to stimulation of nasopulmonary or 'diving' reflex. They need inpatient observation with pulse oximetry and supplemental oxygen. Continued or rebleeding with packs in situ is observed in up to

40% of cases [47].Post nasal packing has failure rate of 26% to 52% and complication rate of 2% to 68% of the cases [61,62].The risk is particularly high in old patients with comorbid conditions like Diabetes, Hypertension, Cardiac illness, Chronic Lung Disease etc.

Chemical cautery with silver nitrate has limited role in posterior epistaxis.

Septal surgeries like Submucosal Resection, Septal correction, Removal of spur are done only to gain access to the site of bleeding.

External carotid artery ligation is a step far away from the source of bleeding. Though the procedure is technically easy, rich vascular anastamosis of nasal mucosa makes it somewhat ineffective [6,8,67]. It also prevents embolization. Complications like cerebrovascular ischemia and infarction have been reported especially in elderly atherosclerotic patients whose cerebral circulation has partly relied on anastamosis between external and internal carotid systems.

Internal maxillary artery ligation was the followed treatment for posterior epistaxis before the advent of endoscopic sphenopalatine artery ligation. It has a success rate of approximately 90% [66] comparable to embolization. It had technical difficulty of finding the artery and its

branches by traditional Caldwell- Luc approach. An Endoscopic approach by a wide middle meatal antrostomy and an instrument port through canine fossa is done now a days.

Anterior and Posterior Ethmoidal artery ligation is done for selected cases as it is the cause of epistaxis in post traumatic ethmoidal complex fractures and accidental injury during endoscopic procedures [88]. Also it has a minimal contribution to nasal blood supply compared to SPA distribution.

Arterial embolization is effective in management of intractable epistaxis[78, 80]. But complications like Hemiplegia, Cerebrovascular Accident, Ophthalmoplegia, Seizures, Facial Nerve Palsy, Soft Tissue Necrosis, Facial Pain, Trismus, Amaurosis, and Ophthalmoplegia are reported [81-84].Though it is effective for external carotid supply it is extremely dangerous for internal carotid system embolization as terminal branches of ophthalmic arteries carries a risk of blindness due to reflux of embolic materials used[86]. Embolic stroke has also been reported. The proximal occlusion of artery relative to surgical ligation leads to formation of collaterals causing recurrent bleeding. The success rate is between 71% and 95% with a complication rate of 27% [50, 65, 85].

Availability of expertise in arterial embolization is another factor which makes it less preferred line of management.

Transnasal endoscopic Sphenopalatine Artery ligation or Cauterization using bipolar diathermy is an ideal treatment in the current scenario as it stops bleeding as close as possible to the nasal source. This procedure is sufficiently distal to make retrograde and anastomotic blood flow from other vessels unlikely. With the advent of endoscopes it has gained increasing popularity and replaced Transantral Ligation. It can be done under general or Local anaesthesia. This procedure uses standard endoscopic sinus surgery instruments available with most of the Otorhinolaryngologists. Diathermy or ligation has a failure rate of 0 to 8 percent[75] and not associated with serious complications as with other procedures. The most common complication is missing a branch which results in recurrent epistaxis. A long term study showed a success rate of 93 percent.[77] With a sound knowledge of sphenopalatine arterial anatomy and its branching pattern one can achieve a success rate as close as 100 % [69].

CONCLUSION

CONCLUSION

The commonest cause of epistaxis in both sexes was found to be idiopathic. Posterior epistaxis usually affects older individuals. Males are commonly affected.

Continued or recurrent bleeding is an indication for surgery, i.e. Ligation or Cauterization.

While dealing with acute epistaxis, universal precautionary measures and securing airway is of utmost importance. The goal of surgery is to occlude the offending artery while preserving normal sinonasal function. The role of rigid nasal endoscopy as a part of initial assessment of epistaxis with direct visualization and control of bleeding point is effective in majority of patients and reduces the need for nasal packing in first place [14].

It is more logical to adopt Transnasal Endoscopic Spheno Palatine Artery Cauterization for posterior epistaxis as sphenopalatine artery is the major contributor of nasal blood supply and it stops bleeding as close as possible to the nasal source.

It can be combined with anterior ethmoid artery ligation if a superior source of bleeding is suspected.

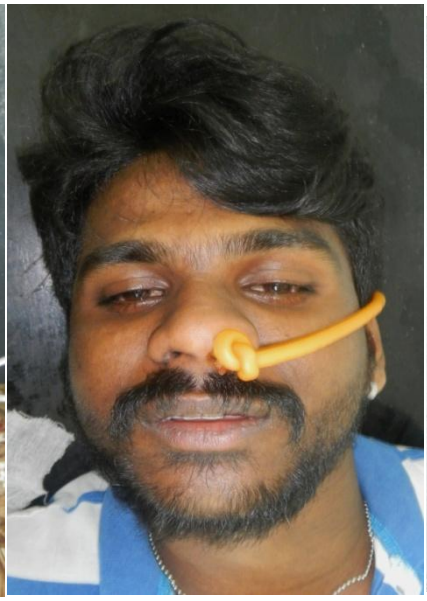
The cost of surgical treatment is less when compared to nasal packing which reduces the economic burden on patients and Government institutions especially in developing countries like us.

It is the most precise, least invasive procedure with high success rate and least complication rate for posterior recurrent and refractory epistaxis.

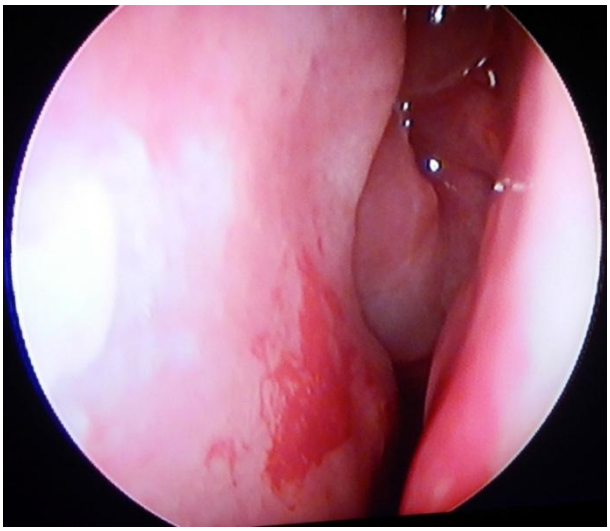
It is the treatment of choice followed nowadays in patients with recurrent and refractory posterior epistaxis which has failed all conventional methods[10, 50, 62, 68-72.]

PHOTOGRAPHS

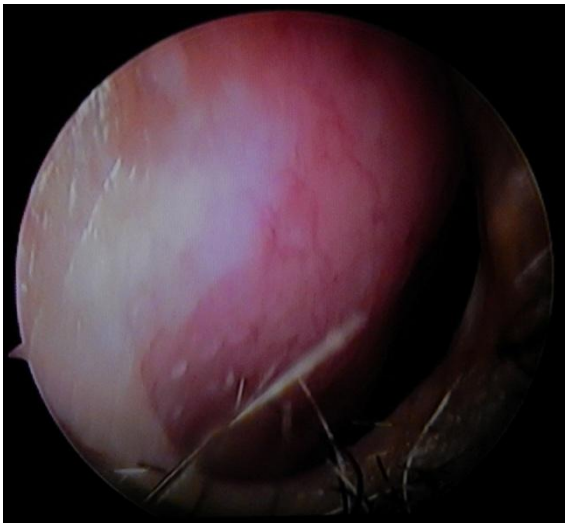
PATIENT WITH ACUTE EPISODE WITH ANTERIOR NASAL PACK



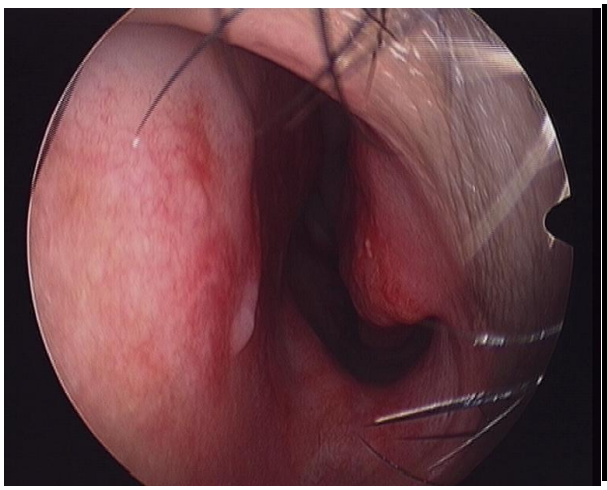
PATIENTS ON POSTNASAL PACK WITH FOLEY'S CATHETER



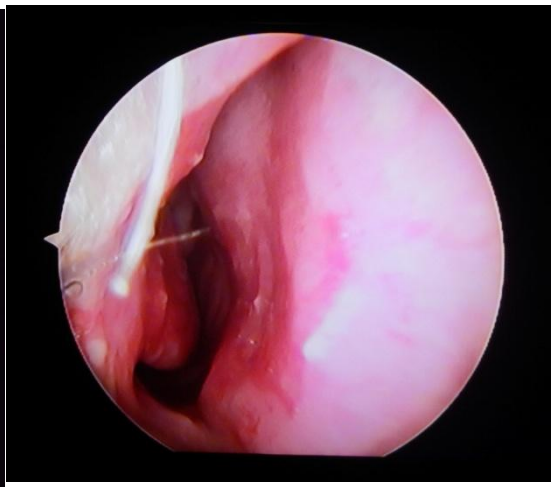
BLEEDING FROM SEPTUM



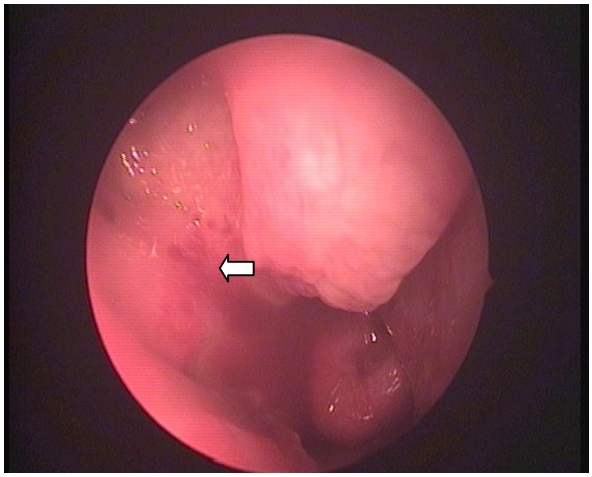
CONGESTION OF LITTLE'S AREA



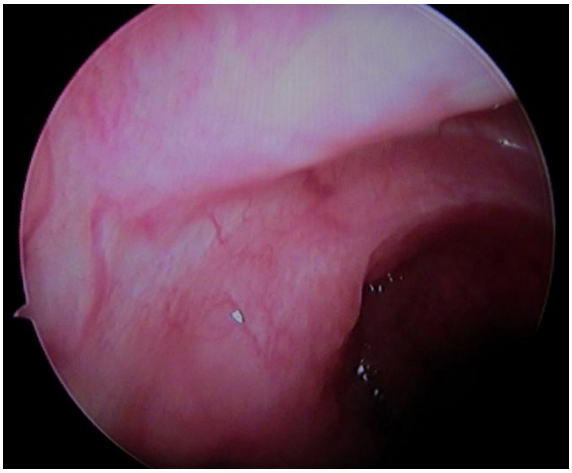
DSL WITH CONGESTION



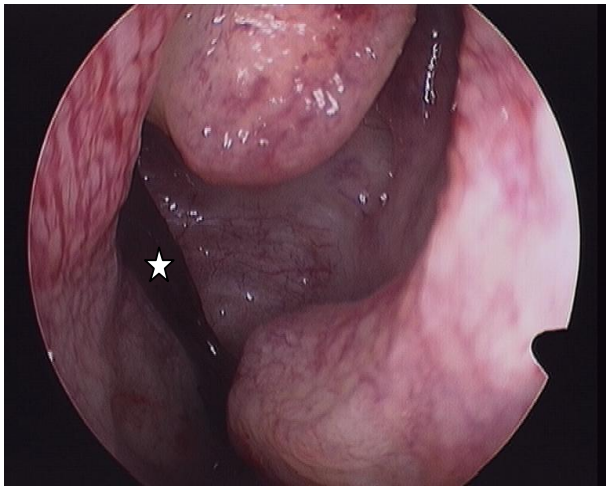
DSR WITH CONGESTION OVER THE SEPTUM



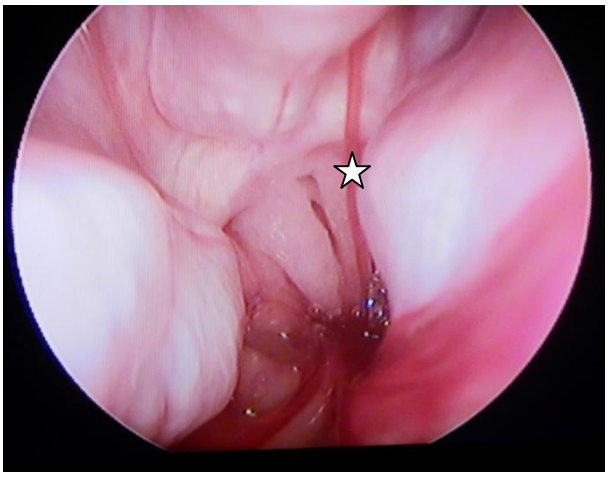
BLEEDING FROM SPHENOPALATINE REGION



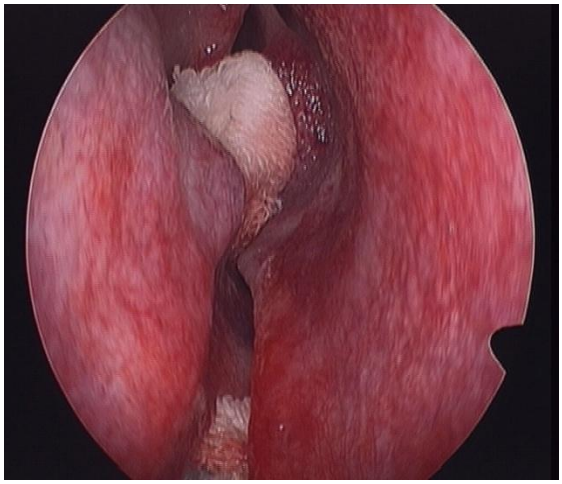
CONGESTION OF SPHENOPALATINE AREA

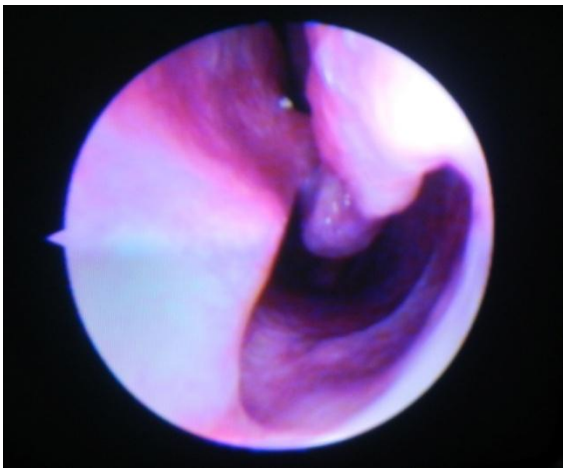


BLOOD STAINED DISCHARGE IN THE SPHENOPALATINE AREA

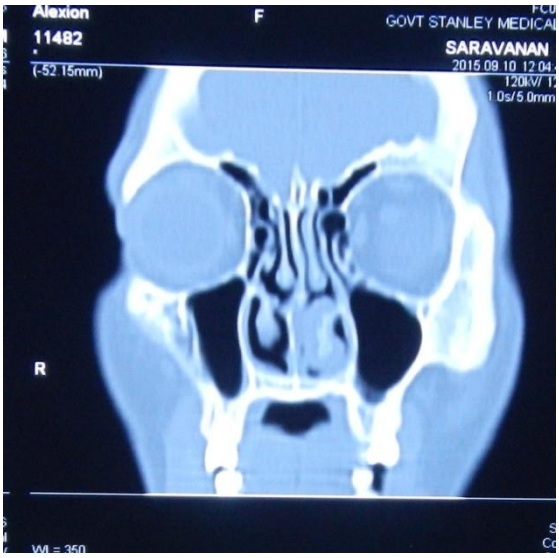


BLEEDING FROM SPHENOETHMOID RECESS





SHARP SPUR IN CONTACT WITH THE INFERIOR TURBINATE



ITH IN CONTACT WITH SEPTUM IN ONE OF OUR PATIENT. SPUR ON THE OPPOSITE SIDE

SEPTAL SPUR IN CONTACT WITH INFERIOR TURBINATE

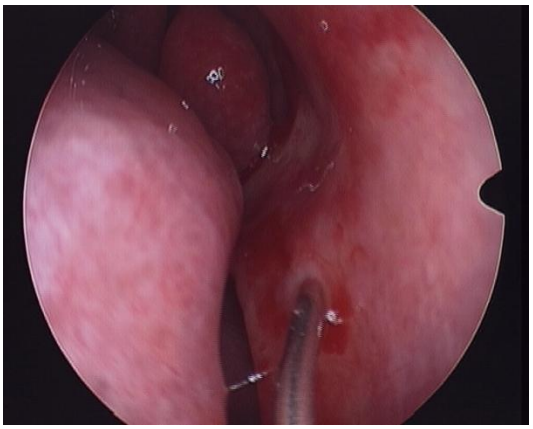
ENDOSCOPIC SET UP WITH HD CAMERA AND MONITOR

HD CAMERA

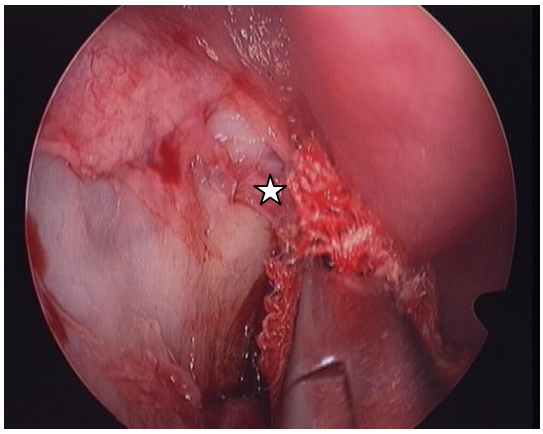
ENDOSCOPES USED - 0 AND 30 DEGREE

BIPOLAR CAUTERY UNIT

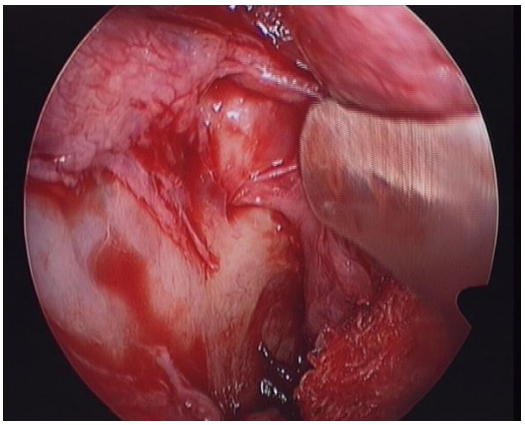
INTRA OP PICTURES

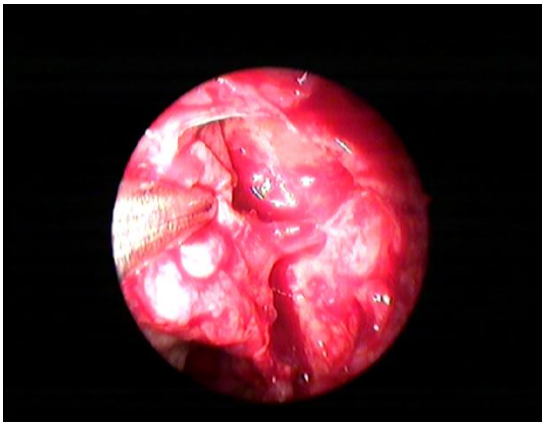


INFILTRATION GIVEN OVER THE SPUR

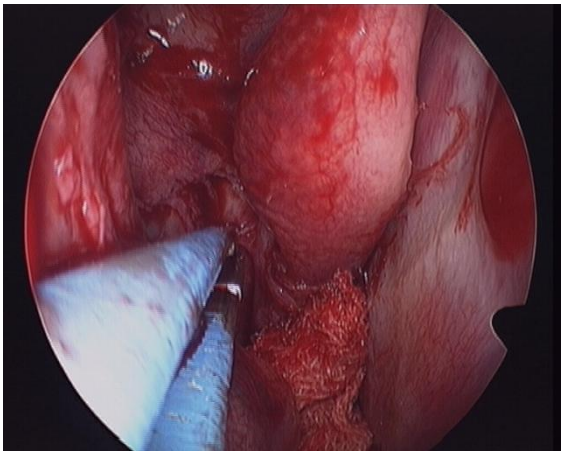


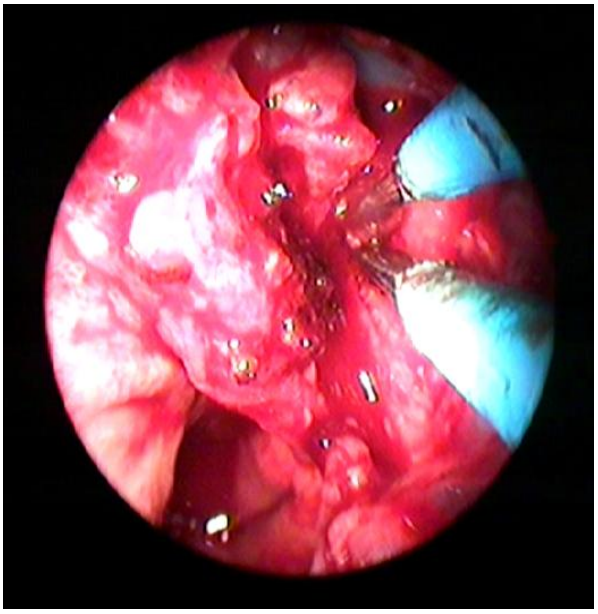
SPA FROM SPHENOPALATINE FORAMEN

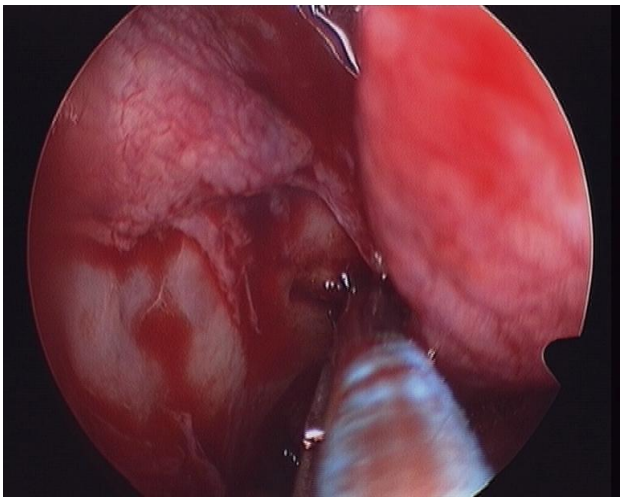




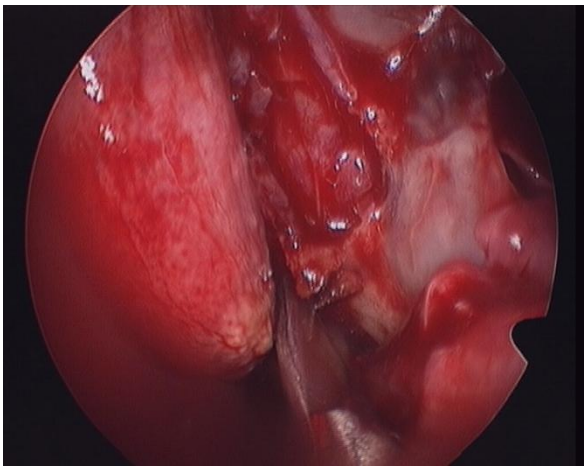
SPA EXITING THE SPHENOPALATINE FORAMEN



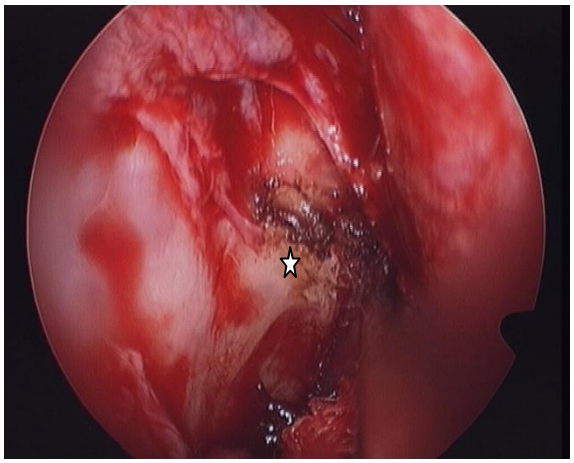




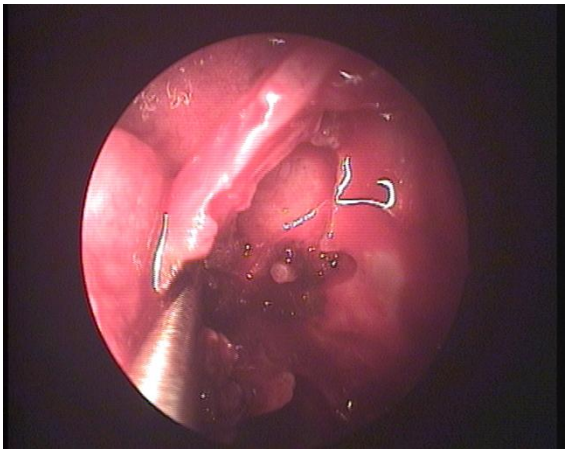
CAUTERIZATION OF SPA WITH BIPOLAR DIATHERMY

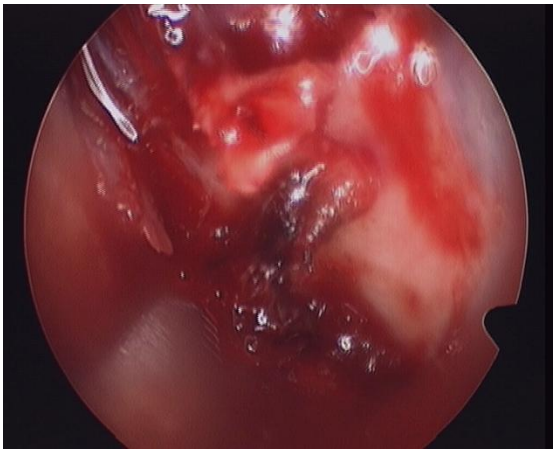


SPA DIVIDED AFTER CAUTERY

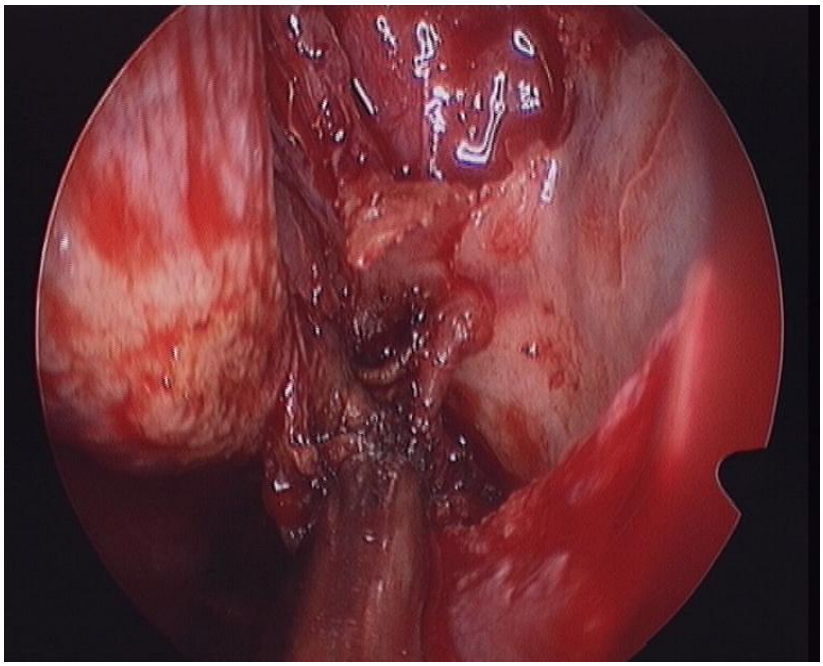


CRISTA ETHMOIDALIS

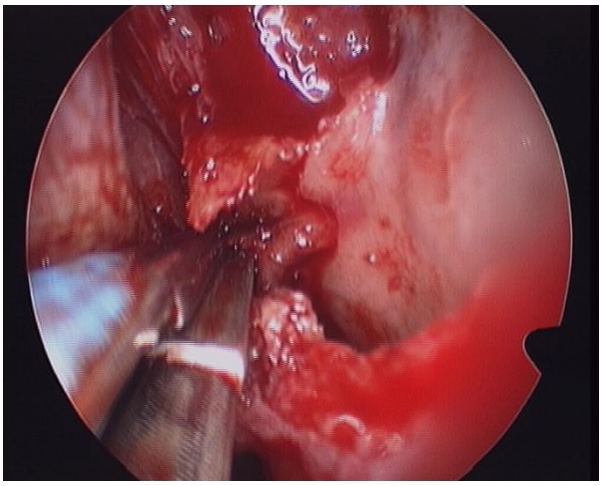


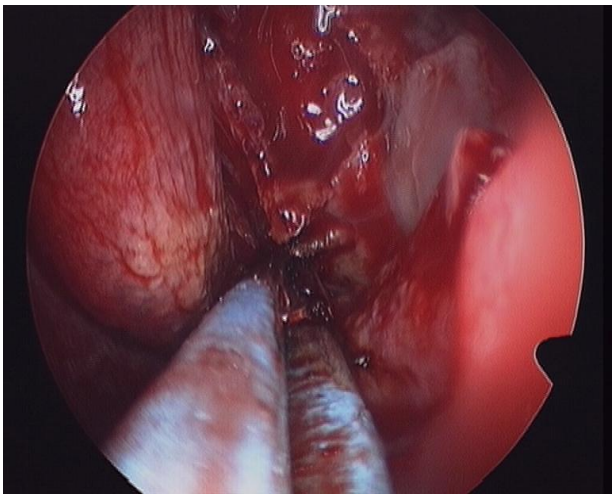


AFTER DIVISION OF SPA



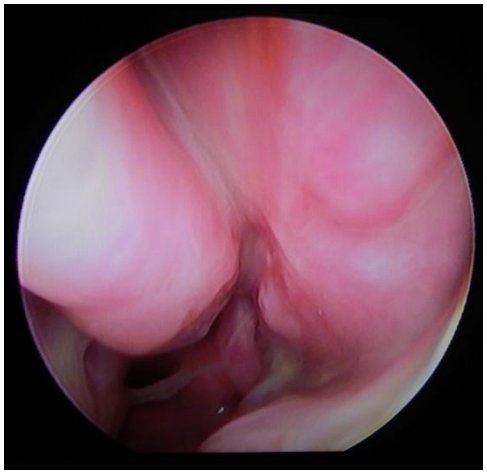
MULTIPLE BRANCHES OF SPA





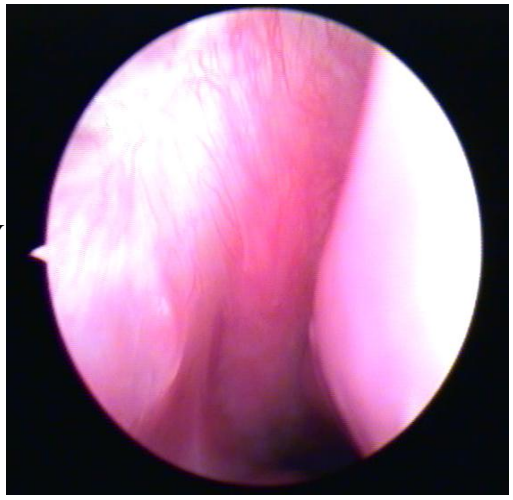
MULTIPLE BRANCHES OF SPA CAUTERISED INDIVIDUALLY

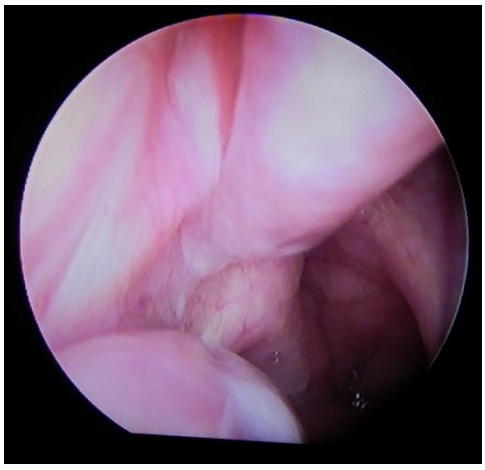
FOLLOW UP PICTURES



ONE MONTH AFTER SURGERY

TWO MONTHS AFTER SURGERY





THREE MONTHS AFTER SURGERY

ANNEXURES

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PROFORMA FOR A CASE OF EPISTAXIS EVALUATION

Name: Age / Sex: Religion:

Address: I.P. No:

Occupation:

Complaints:

H/o present illness

Elaboration of complaints:

Mode of onset

Duration

Volume

Colour

Fresh or clot

Aggravating / relieving factors

H/O Nasal obstruction

Nasal discharge /post nasal drip

Smell disturbance

Snoring

Headache

Facial pain

H/o Trauma / Nose picking / nose blowing

Recurrent upper respiratory tract infection/sneezing / allergy

Lifting heavy weight / exercise

Chronic cough

Constipation

Dysuria / to rule out benign prostatic hypertrophy

Bleeding diathesis: any spontaneous epistaxis/gum bleeding

Hemoptysis / haematemesis / haematuria / haemarthrosis / Intracranial Haemorrhage / seizures

H/O fever, petechiae or purpura

H/O Vision disturbances / abdominal pain / dragging sensation

Ear pain / fullness Hard of hearing

Change of voice

PAST HISTORY

Any h/o episode of epistaxis and other spontaneous bleeding

Any h/o previous surgery

Any h/o previous hospital admission

Any h/o Blood transfusion

Any h/o exanthematous fever

Any h/o Anticoagulant medication like salicylates, heparin

PERSONAL HISTORY

Diabetes / Hypertension / Ischemic Heart Disease/ Pulmonary tuberculosis / seizures

Snuff inhalation

Smoking / alcoholic

Psychiatric disturbance / self inflicted injury

FAMILY HISTORY

H/o familial bleeding disease & hereditary haemorrhagic telangiectasia

GENERAL EXAMINATION :

Patient conscious, oriented, afebrile, anaemic / not anaemic

Icterus / generalized lymphadenopathy / generalised edema, facial edema

Integrity of facial skeleton

RS – NVBS, added sounds (Normal vesicular breath sounds)

CVS – S1,S2 heard / no murmur / S3S4 sounds / galloping

CNS – Higher functions, cranial nerves

ABD – Organomegaly

Skin – any purpura / petechiae / exanthema

LOCAL EXAMINATION

NOSE: External contour

Shape

Scar

Ulcer

Fistula

Edema

Crepitus

Tenderness

NASAL CAVITY (Anterior Rhinoscopy)

- Vestibule
- Septum
- Turbinates / meatus
- Nasal mucosa
- Posterior Rhinoscopy
- Choanae

AIRWAY PATENCT TESTS

- Cottle's test
- Cotton wool test
- Cold spatula test

POST NASAL EXAMINATION

EXAMINATION OF EAR

- External ear
- External auditory canal
- Tympanic membrane
- Tuning fork tests
- Facial nerve and vestibular functions

EXAMINATION OF THROAT

- Oral cavity
- Oropharynx
- Indirect Laryngoscopy

EXAMINATION OF NECK

DIAGNOSTIC NASAL ENDOSCOPY PROFORMA

GOVT. STANLEY MEDICAL COLLEGE, CHENNAI - 1

EPARTMENT OF ENT

Name: Age / Sex:

IP/OP No: Date:

Indications:

Headache :

Nasal block :

Nasal discharge:

Epistaxis:

Anosmia:

Sneezing:

Scopes used: 0^{O} / 30^{o} / 45^{o}

PASSES	RIGHT SIDE	LEFT SIDE
I – Pass ➢ Nasal mucosa ➢ Inferior turbinate ➢ Inferior Meatus ➢ ET – orifice ➢ Nasopharynx ➢ Fossa of Rossenmuller		

II – Pass ➢ Nasal mucosa ➢ Superior Turbinate / Meatus ➢ Supreme Turbinate / Meatus ➢ Spheno ethmoidal Recess ➢ Sphenoid ostia		
III – Pass ➢ Nasal Mucosa ➢ Middle Turbinate ➢ Middle Meatus ➢ Uncinate ➢ Bulla ➢ Hiatus ➢ Accessory Ostia		
Nasal septum & Mucosa		

CONCLUSION

INSTITUTIONAL ETHICAL COMMITTEE, STANLEY MEDICAL COLLEGE, CHENNAI-1

Title of the Work : A study of management of refractory posterior Epitasis by Endoscopic sphenopalative artery cauterization. .

Principal Investigator : Dr. S Karthik,

Designation : M.S ,(E N T)

Department : Department of E N T
Government Stanley Medical College,
Chennai-01

The request for an approval from the Institutional Ethical Committee (IEC) was considered on the IEC meeting held on 26.11.2014 at the Council Hall, Stanley Medical College, Chennai-1 at 2PM

The members of the Committee, the secretary and the Chairman are pleased to approve the proposed work mentioned above, submitted by the principal investigator.

The Principal investigator and their team are directed to adhere to the guidelines given below:

1. You should inform the IEC in case of changes in study procedure, site investigator investigation or guide or any other changes.
2. You should not deviate from the area of the work for which you applied for ethical clearance.
3. You should inform the IEC immediately, in case of any adverse events or serious adverse reaction.
4. You should abide to the rules and regulation of the institution(s).
5. You should complete the work within the specified period and if any extension of time is required, you should apply for permission again and do the work.
6. You should submit the summary of the work to the ethical committee on completion of the work.

MEMBER SECRETARY,
IEC, SMC, CHENNAI

தகவல் படிவம்

தங்களுக்கு செய்த பரிசோதனைகள் மூலம் தங்கள் மூக்கின் பின் பகுதியில் உள்ள இரத்தக்குழாயிலிருந்து இரத்தக் கசிவு ஏற்பட்டுகிறது என்பது தெரிய வந்துள்ளது. இதன் விளைவாக அதிகப் படியான இரத்தப்போக்கு ஏற்ப்படும் அபாயம் உள்ளது.

இந்த நோயின் தன்மை மற்றும் காரணம் கண்டறிய Diagnostic Nasal Endoscopy CT SCAN மற்றும் இரத்தப் பரிசோதனைகள் மேற்க்கொள்ளப்பட உள்ளது. இந்த பரிசோதனைக்குபின் Endoscopic Sphenopalatine Artery Cauterization என்னும் அறுவை சிகிச்சை மூலம் மூக்கின் பின் பகுதியின் இரத்தக் கசிவு ஏற்படுத்தும் இரத்தக்குழாயை கட்டுப்படுத்த உள்ளது. இவ்வறுவைசிகிச்சையின் திறன்தன்மையில் ஆய்வு மேற்கொள்ளப்பட உள்ளது.

தங்கள் விரும்பினால் மருத்துவ ஆய்விலிருந்து எப்பொழுது வேண்டுமானாலும் விலகிக்கொள்ளலாம். எந்த சட்ட சிக்கலுக்கும் எப்பொழுதும் வேண்டுமானாலும் தாங்கள் ஆய்விலிருந்து விலகிக் கொள்ளலாம்.

இந்த ஆய்வின் மூலம் கிடைக்கும் தகவல்களும் பரிசோதனை முடிவுகளும் தாங்களின் ஒப்புதலின் மூலம் மட்டுமே ஆய்வில் பயன்படுத்தப்படும்.

ஆய்வாளரின் கையொப்பம் :

ஆய்வாளரின் பெயர் :

இடம் :

நாள் :

சுய ஒப்புதல் படிவம்

ஆராய்ச்சி நிலையம்: காது, மூக்கு தொண்டை பிரிவு
அரசு ஸ்டான்லி மருத்துவக்கல்லூரி
மருத்துவமனை

பங்கு பெறுபவரின் பெயர் :

பங்கு பெறுபவரின் எண். :

மருத்துவப் பரிசோதனையின் விவரங்கள் எனக்கு விளக்கப்பட்டுள்ளது. எனது மூக்கின் பின் பகுதியில் இரத்தக் குழாயிலிருந்து ரத்தக் கசிவு ஏற்பட்டுள்ளது என்பது தெரியப்படுத்தப்பட்டது. பரிசோதனை முறையின் சந்தேகங்களை கேட்கவும் அதற்கான தகுந்த விளக்கங்களை பெறவும் வாய்ப்பளிக்கப்பட்டது. இந்த நோயின் தன்மை கண்டறிய CT SCAN Diagnostic Nasal Endoscopy மற்றும் ரத்தப்பரிசோதனைகள் தேவைப்படும் என்பதும் எனக்கு விளக்கப்பட்டது. மேலும் இப்பிரச்சனைக்கு Endoscopic Sphenopalatine Artery Cauterization என்னும் அறுவை சிகிச்சை தேவைப்படும் என்பதும், அதன் விளைவுகளும் தெளிவாக எடுத்துறைக்கப்பட்டது. இந்த சோதனைமுறைகள் மற்றும் அறுவைசிகிச்சையின் விளைவுகளை ஆய்வில் பயன்படுத்த தன்னிச்சையாக சம்மதிக்கிறேன். எக்காரனத்தினாலும் எந்த கட்டத்திலும் எந்த சட்ட சிக்களுக்கும் உட்படாமல் இவ்வாய்வில் இருந்து விலகிக் கொள்ளலாம் என்றும் அரிந்து கொண்டேன்.

இந்தப் பரிசோதனைகள் மற்றும் அறுவைசிகிச்சையின் மூலம் கிடைக்கும் தவல்களை மருத்துவர் மேற்கொள்ளும் ஆய்வில் பயன்படுத்திக் கொள்ளவும் அதை பிரசுரிக்கவும் தேவைப்பட்டால் என்னையும் எனக்கு மேற்க்கொள்ளப்படும் பரிசோதனை முறைகளையும் புகைப்படம் எடுக்கவும் நான் முழு மனதுடன் சம்மதிக்கிறேன்.

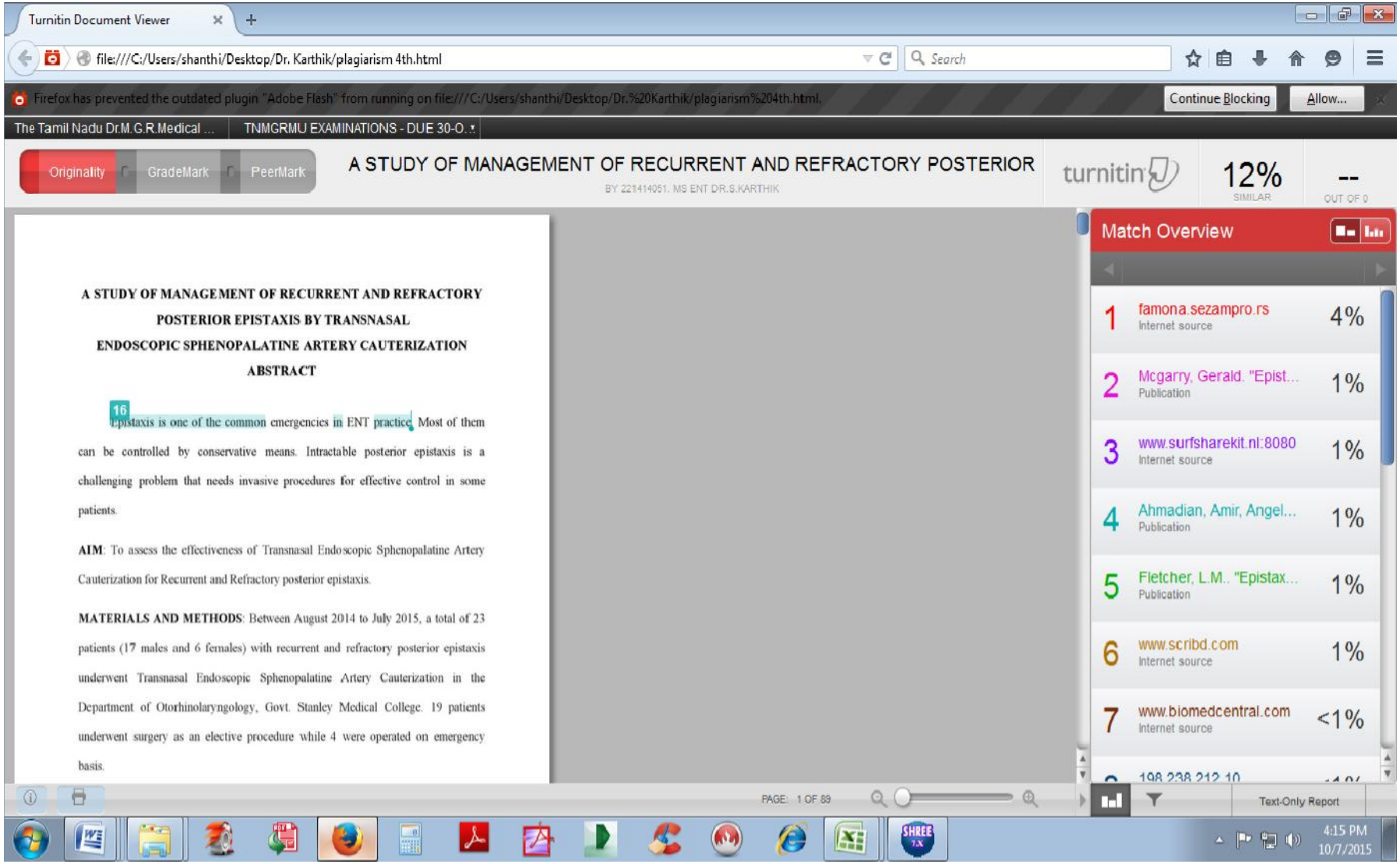
பங்கேற்பவரின் கையொப்பம் நாள்:

கட்டைவிரல் ஒப்பம்: இடம்:

பங்கேற்பவரின் பெயர் மற்றும் விலாசம்

ஆய்வாளரின் கையொப்பம் நாள்:

ஆய்வாளரின் பெயர் இடம்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A STUDY OF MANAGEMENT OF RECURRENT AND REFRACTORY POSTERIOR EPISTAXIS BY TRANSNASAL ENDOSCOPIC SPHENOPALATINE ARTERY CAUTERIZATION
ABSTRACT
Epistaxis is one of the common emergencies in ENT practice. Most of them can be controlled by conservative means. Intractable posterior epistaxis is a challenging problem that needs invasive procedures for effective control in some patients.
AIM: To assess the effectiveness of Transnasal Endoscopic Sphenopalatine Artery Cauterization for Recurrent and Refractory posterior epistaxis.
MATERIALS AND METHODS: Between August 2014 to July 2015, a total of 23 patients (17 males and 6 females) with recurrent and refractory posterior epistaxis underwent Transnasal Endoscopic Sphenopalatine Artery Cauterization in the Department of Otorhinolaryngology, Govt. Stanley Medical College. 19 patients underwent surgery as an elective procedure while 4 were operated on emergency basis.
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KEY TO MASTER CHART

1	A	ANEMIA
2	AL	ALCOHOLIC
3	B	BLEEDING IN THE SPHENOPALATINE AREA
4	B	BLEEDING
5	BL	BILATERAL
6	C	CONGESTION IN THE SPHENOPALATINE AREA
7	CL	CLOTS IN THE SPHENOPALATINE AREA / CHOANA
8	D	NASAL DISCHARGE
9	DM	DIABETES
10	DSL	DEVIATED NASAL SEPTU TO LEFT
11	DSR	DEVIATED NASAL SEPTUM TO RIGHT
12	F	FEMALE
13	H	HEADACHE
14	HT	HYPERTENSION
15	IT	INFERIOR TURBINECTOMY
16	L	LEFT
17	M	MALE
18	MMA	MIDDLE MEATAL ANTROSTOMY
19	NB	NO BLEEDING
20	O	NASAL OBSTRUCTION
21	R	RIGHT
22	SC	SEPTAL CORRECTION
23	SM	SMOKING
24	SMR	SUBMUCOSAL RESECTION
25	SPUR	SEPTAL SPUR

MASTER CHART

S.NO	NAME	AGE IN YEARS	GENDER	IN PATIENT/OUT PATIENT NO.	NO. OF EPISODES	OTHER SYMPTOMS	COMORBID CONDITIONS	DNE FINDINGS	MEDICAL MANAGEMENT	TYPE OF PROCEDURE	SIDE ADDRESSED	SPA-FINDINGS. NO. OF BRANCHES SEEN IN EACH SIDES	ADDITIONAL PROCEDURES	FOLLOW UP 1 WEEK	FOLLOW UP 3 WEEKS	FOLLOW UP 4 WEEKS	FOLLOW UP 8 WEEKS	FOLLOW UP 12 WEEKS
1	SURYA KUMAR	25	M	281412	5	O/D	NIL	DSR/C	YES	ELECTIVE	RIGHT	R-2	NIL	NB	NB	NB	NB	NB
2	KUMAR	40	M	282448	6	NIL	AL/DM/HT	DSR/R-B/L-C	YES	ELECTIVE	BOTH SIDES	R-2/L-2	SC/BL-MMA	NB	NB	NB	NB	NB
3	RAVINDRAN	50	M	1439239	4	O/H	SM/AL/HT	DSR/DSL/R-C	YES	ELECTIVE	BOTH SIDES	R-1/L-2	SMR/BL-MMA	NB	NB	NB	NB	NB
4	SATHISH KUMAR	33	M	253805	5	O/H	SM/AL	R-C/L-C	YES	ELECTIVE	BOTH SIDES	R-2/L-2	NIL	NB	NB	NB	NO FOLLOW UP	NO FOLLOW UP
5	SAVITHRI	48	F	259281	8	O/D	A	DSL/R-B/L-C	YES	EMERGENCY	BOTH SIDES	R-2/L-3	SC	NB	NB	NB	NB	NB
6	DHEEPAMMA	36	F	27310	5	NIL	NIL	DSR/DSL	YES	ELECTIVE	BOTH SIDES	R-2/L-2	SMR/BL-MMA	NB	NB	NB	NB	NB
7	KUMAR	35	M	1436310	7	NIL	SM	DSL/R-CL	YES	ELECTIVE	BOTH SIDES	R-3/L-2	SC	NB	NB	NB	NB	NB
8	KANNAN	60	M	1447878	10	O	SM/AL/DM/HT	R-C/L-B	YES	EMERGENCY	BOTH SIDES	R-2/L-2	BL-MMA	NB	NB	NB	NB	NB
9	MOHMMAD UMAR	48	M	1450326	7	NIL	AL	DSR	YES	ELECTIVE	BOTH SIDES	R-3/L-3	SC	NB	NB	NB	NB	NB
10	PONNAIAH	55	M	1453956	6	NIL	AL/DM/HT	DSR/R-B/L-CL	YES	EMERGENCY	BOTH SIDES	R-2/L-2	SC	NB	NB	NB	NB	NB
11	MOHMMAD AZIZ	42	M	1463308	8	O/H	NIL	DSR/R-C	YES	ELECTIVE	BOTH SIDES	R-1/L-1	NIL	NB	NB	NB	NB	NB
12	MAQBUL	45	M	1419370	5	O	AL	DSL/L-SPUR	YES	ELECTIVE	BOTH SIDES	R-2/L-2	SMR	NB	NB	NB	NB	NB
13	NEELAKANDAN	49	M	1427281	6	O	NIL	DSR	YES	ELECTIVE	BOTH SIDES	R-2/L-3	NIL	NB	NB	NB	NB	NB
14	SIVAKUMAR	26	M	1620442	10	NIL	NIL	DSR	YES	ELECTIVE	BOTH SIDES	R-3/L-3	SMR/BL-MMA/BL-IT	NB	NB	NB	NB	NB
15	SELVI	41	F	1511089	7	NIL	NIL	DSR/R-B/L-B/R-SPUR	YES	EMERGENCY	BOTH SIDES	R-2/L-2	SMR	NB	NB	NB	NB	NB
16	GANESAN	47	M	1505757	6	O/H	SM/AL	DSR	YES	ELECTIVE	BOTH SIDES	R-1/L-1	SMR	NB	NB	NB	NB	NB
17	SATHYAMOORTHY	30	M	75085	12	NIL	SM/A	DSR/L-CL	YES	ELECTIVE	LEFT	L-2	SC/L-MMA/L-IT	NB	L-B	NB	NB	NB
18	MUNUSAMY	60	M	1509530	7	NIL	SM/AL/DM/HT	DSL/DSR/R-CL/L-C	YES	ELECTIVE	BOTH SIDES	R-3/L-3	SMR	NB	NB	NB	NO FOLLOW UP	NO FOLLOW UP
19	RAJESHWARI	42	F	1510432	8	NIL	A	R-C	YES	ELECTIVE	RIGHT	R-3	NIL	NB	NB	NB	NB	NB
20	VASUKI	45	F	1523259	15	O/H	NIL	DSL	YES	ELECTIVE	BOTH SIDES	R-2/L-2	BL-MMA/L-IT	NB	NB	NB	NB	NB
21	MANIKANDAN	22	M	242496	6	O	NIL	DSR/R-CL	YES	ELECTIVE	RIGHT	R-2	SC	NB	NB	NB	NB	NB
22	KOKILA	33	F	281156	7	O/H	A	DSL/R-C/L-C	YES	ELECTIVE	BOTH SIDES	R-1/L-1	SMR	NB	NB	NB	NB	NB
23	SARAVANAN	40	M	312422	5	O	SM/AL	DSR/R-C	YES	ELECTIVE	BOTH SIDES	R-2/L-2	SMR/BL-MMA	NB	NB	NB	NB	NB